REVCO

Blood Bank Refrigerators

Installation and Operation Manual

Table of Contents

Introduction 1
Safety Precautions 1
Unpacking and Inspection. 2
Installation. 2
Drawers. 3
Control Panel 4
Operation 6
Temperature Control 6
Alarm Systems 7
Chart Recorders 8
Cleaning 9
Troubleshooting 10
Accessories. 11
Warranty 12

34830H21 Rev. F

© 2005 Revco
All rights reserved
Printed in U.S.A.

Table of Contents

1 Introduction **1**

2 Safety Precautions **1**

3 Unpacking and Inspection **2**

4 Installation **2**

4.1 Location 2

4.2 Wiring 2

4.3 Leveling 2

4.4 Glass Doors 2

4.5 Door Seal 3

4.6 Final Checks 3

5 Drawers **3**

5.1 Removing the Drawers 3

5.2 Reinstalling the Drawers 3

5.3 Changing Drawer Slide Position 3

5.4 Control Panel Features 4

6 Control Panel **4**

6.1 Display Functions 5

6.2 Programming Functions 5

6.3 Service Parameters 5

7 Operation **6**

7.1 Start Up 6

7.2 Product Loading Guidelines 6

7.3 Automatic Defrost 6

8 Temperature Control **6**

8.1 Setpoint Control 6

8.2 Sensor Bottles 6

9 Alarm Systems 7

9.1 Operating the Alarm 7

9.2 Local and Remote Alarms 7

9.3 Installing a Remote Alarm (Optional) 7

9.4 Alarm Test 7

9.4.1 Theory of Operation 7

9.4.2 Alarm Test Procedure 7

10 Chart Recorders 8

10.1 Six Inch Seven-Day Recorder 8

10.1.1 Set Up and Operation 8

10.1.2 Power Supply 8

10.1.3 Changing Chart Paper 8

10.1.4 Calibration Adjustment 8

10.2 Four Inch Recorder (Space Saver models only) 8

11 Cleaning 9

11.1 Cleaning the Drawers and Cabinet Interior 9

11.2 Cleaning the Condenser 9

12 Troubleshooting 10

13 Optional Accessories 11

14 Warranty 12

14.1 Domestic Warranty
13 Months Full Warranty, Parts and Labor
United States of America and Canada 12

14.2 International Warranty
16 Month Parts Warranty 12

14.3 Extended Warranty Options 12

1 Introduction

Revco blood bank refrigerators are designed to meet strict AABB, ANRC and FDA requirements for stored product safety.

This manual provides installation and operation instructions for: Undercounter models (4.7 ft^3), Space Saver models (11.5 ft^3) and Upright models (23.3, 29.2 and 51.1 ft^3). Refer to Table 1 to determine the specifications that apply to your unit.

The IntrLogic® control system, standard on all models, includes:

- Key-operated power and alarm switch
- Preset temperature setpoint
- Digital temperature display with 0.1°C resolution
- Graphic temperature display
- Audible and visual power failure indicators
- Alarm silence, ringback, and automatic reset functions
- Pushbutton alarm test

Other standard features include:

- Keyed door locks
- Remote alarm contacts
- CFC-free refrigerant
- CFC-free foamed in-place urethane insulation
- Quiet, hermetically sealed refrigeration compressors

Upright models (23.3 ft^3 and larger) also have: fully extendable stainless steel drawers; a sensor selection button (for upper and lower cabinet temperature readings); and an independent switch for interior cabinet lights.

Seven day chart recorders are standard on all models.

2 Safety Precautions

In this manual and on labels attached to this product, the words WARNING and CAUTION mean the following:

- WARNING: a potentially hazardous situation which, if not avoided, could result in serious injury or death.
- CAUTION: a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or damage to the equipment.

Before installing, using or maintaining this product, please be sure to read this manual and product warning labels carefully. Failure to follow these instructions may cause this product to malfunction, which could result in injury or damage.

Below are important safety precautions that apply to this product:

- Use this product only in the way described in the product literature and in this manual. Before using it, verify that this product is suitable for its intended use.
- Do not modify system components, especially the controller. Use OEM exact replacement equipment or parts. Before use, confirm that the product has not been altered in any way.
- Your unit must be properly grounded in conformity with national and local electrical codes. Never connect the unit to overloaded power sources.
- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls.

Table 1. Revco Blood Bank Refrigerator Specifications

Model	Voltage Code[a]	Amps/ Breaker	Cu. Ft./ Liters	Cabinet	Door	Drawers/ 450ml bags	Dimensions H x F-B x W in. (cm)		Net Prod. Wt. lbs (kg)
							Interior	Exterior	
REB-404	A	6.0/15	4.7/	Undercounter	Single solid	2/48	20 x 20.5 x 20 (50.8 x 52 x 50.8)	34 x 26 x 24 (86.2 x 66 x 61)	200 (91)
	D	6.0/15							
	V, W	6.0/15							
REB-1204	A	9.4/15	11.5/ 326	Space Saver	Single hinged glass	5/165	52.4 x 21.75 x 20 (133.2 x 55.2 x 50.8)	71.9 x 28.75 x 24 (182.6 x 73 x 61)	320 (146)
	D	6.0/15							
	V, W	6.0/15							
REB-2304	A	9.4/15	23.3 659	Upright	Single hinged glass	6/360	58 x 29 x 24 (147.3 x 73.7 x 61.0)	77.5 x 36.2 x 28 (196.9 x 92.0 x 71.1)	425 (193)
	D	6.0/15							
	V, W	6.0/15							
REB-3004	A	9.4/15	29.2/ 826	Upright	Single hinged glass	6/462	58 x 29 x 30 (147.3 x 73.7 x 76.2)	77.5 x 36.2 x 34 (196.9 x 92.0 x 86.4)	500 (227)
	D	6.0/15							
	V, W	6.0/15							
REB-5004	A	15.0/20	51.1/ 1447	Upright	Double hinged glass	12/720	58 x 29 x 52.5 (147.3 x 73.7 x 133.4)	77.5 x 36.2 x 56.5 (196.9 x 92.0 x 143.5)	640 (290)
	D	8.5/15							
	V, W	8.5/15							

[a] A = 115V, 60Hz; D = 208/230V, 60Hz; V = 220V, 50Hz; W = 240V, 50 Hz

3 Unpacking and Inspection

At delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.

If there is no exterior damage, unpack and inspect the equipment within five days of delivery. If you find any damage, keep the packing materials and immediately report the damage to the carrier. ***Do not return goods to Revco without written authorization.*** When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

4 Installation

4.1 Location

Install the unit in a level area free from vibration with a minimum of 6 inches of space on the sides and rear and 12 inches at the top.

Do not position the equipment in direct sunlight or near heating diffusers, radiators, or other sources of heat. The ambient temperature range at the location must be 59 to 90°F (15 to 32°C).

4.2 Wiring

CAUTION! Connect the equipment to dedicated, power source with the correc Power fluctuations or incorrect voltage c severe damage to the equipment.

DANGER! For personal safety and tr operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

Always connect the equipment to a dedicated (separate) circuit. Electrical codes require fuse or circuit breaker protection for branch circuit conductors. Use time delay fuses for #12 AWG circuits.

For all blood bank models, the wiring diagram is attached to the back of the cabinet.

AutoVent
2000/3000
Operating Manual
Version 1.5 NSN

4.3 Leveling

The unit must be level. Rotate the leveling screws, located under the front corners of the unit, until the unit is level. If the floor is seriously out of level, you may need to shim the corners with thin sheets of metal.

Note: *Use thin sheets of metal to level units equipped with optional casters.*

4.4 Glass Doors

All Space Saver and Upright models have standard dual-pane glass doors, insulated to prevent condensation.

Glass door tension on Upright models can be adjusted. Check the door operation. If the self-closing doors do not work properly, make sure the unit is level. If the unit is level and the doors do not self-close, adjust the door tension.

CAUTION! Do not overtighten the tension as damage to the equipment can result.

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

You can use a regular screwdriver to adjust spring tension and ch door on its frame. The adjustment screws ("torque" n and "sag" for door placement) are located on the nge bracket (shown below in Figure 1).

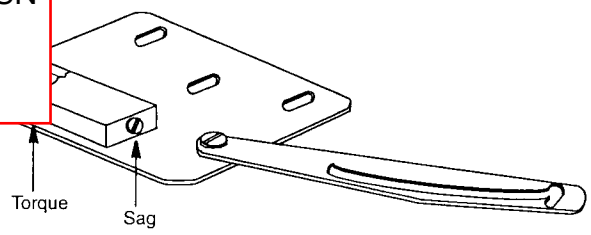


Figure 1. Bottom Hinge Bracket for Glass Doors

Hinged glass doors can be propped open with metal braces at the bottom hinges. Open the door 90 degrees or until you feel some resistance. Push the door open past the resistance and the metal braces engage. To close the door, push it toward the unit (past the resistance).

4.5 Door Seal

To check the door seal, complete the following steps:

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4-inch intervals around the door. If the door does not seal properly, you need to either replace the gasket, or adjust the door (see Section 4.4).

⚠ **CAUTION!** Door seal integrity is critical for blood bank refrigerators. A loose fitting gasket allows moist air to be drawn into the cabinet, resulting in quicker frost buildup on the evaporator coil, longer running time, poor temperature maintenance, and increased operation cost.

The door seals on 12 ft^3 models can be adjusted. To correct a faulty seal on these units, complete the following steps:

1. Open the door completely.
2. Remove the hinge pin cover to expose the door mounting screws. This cover pops off.
3. Loosen the screws and move the door side of the hinge to decrease the clearance between the gasket and the cabinet.
4. Tighten the screws and snap the hinge pin covers on.
5. Recheck the seal.
6. If the door does not seal properly, replace the gasket.

4.6 Final Checks

Before start up, complete the following steps:

1. Make sure that the unit is free of all wood or cardboard shipping materials, both inside and outside.
2. Check the positions of the stainless steel drawers. If you want to adjust the drawer slides in an Upright unit, follow the instructions in Section 5.3.
3. Verify that the unit is connected to a dedicated circuit.

5 Drawers

5.1 Removing the Drawers

To remove the drawers in Upright models (23 ft^3 and larger) complete the following steps (refer to Figure 2):

1. Pull the drawer toward you until the slides are fully extended.
2. Lift the back of the drawer to disengage the mounting tabs from the slots on the slides.

Note: *The drawers fit snugly between the slides. Push the back of the drawer from underneath to remove the drawer.*

3. Raise the back of the drawer almost to a vertical position and disengage the front mounting clips from the slides.

To remove the drawers on Space Saver models, depress the hooks located on both sides of the drawers (about 1/3 of the way back) and slide the drawers up and out.

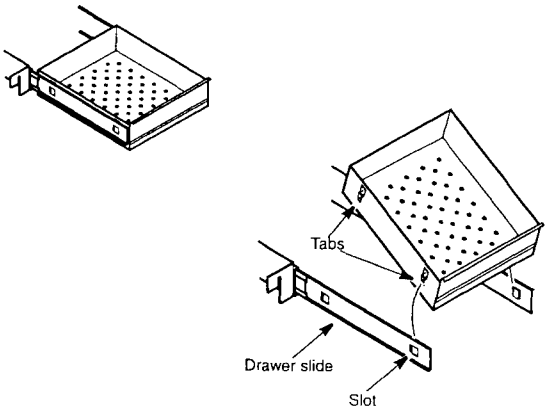


Figure 2. Drawer Removal (Upright Models)

5.2 Reinstalling the Drawers

To reinstall the drawers in Upright models, complete the following steps (refer to Figure 2):

1. Pull both drawer slides toward you until the slides are fully extended.
2. Position the drawer between the slides and insert the front mounting clips into the slots on front of the slides.
3. Push the back of the drawer down between the slides and insert the drawer tabs into the back slots.

Note: *The drawers fit snugly between the slides. Push on the back of the drawer from the inside to insert the drawer tabs completely into the slots. Make sure both drawer tabs are aligned with the slots on the slides before pushing the drawer down between the slides.*

5.3 Changing Drawer Slide Position

The drawer slides are adjustable. You can position these slides in the vertical slots which are spaced at one-inch intervals.

Drawer slides have a small wire safety clip at the front pilaster which prevents the slides from falling when the drawers are removed. To change the position of the drawer slides, complete the following steps:

1. Locate the safety clip.
2. Slip your fingernail or a small screwdriver under the bottom of the wire clip and pry the clip out toward the inside of the refrigerator.
3. Lift up the slide at the front. The slide is free to move from the front pilaster.
4. The drawer slide must be removed from the rear pilaster at approximately a 45 degree angle toward the center of the cabinet.
5. Pull the slide toward the front of the cabinet.

⚠ **CAUTION!** Drawer slides do *not* require lubrication. Additional lubricant could impede movement of the drawers when the lubricant is cold.

6 Control Panel

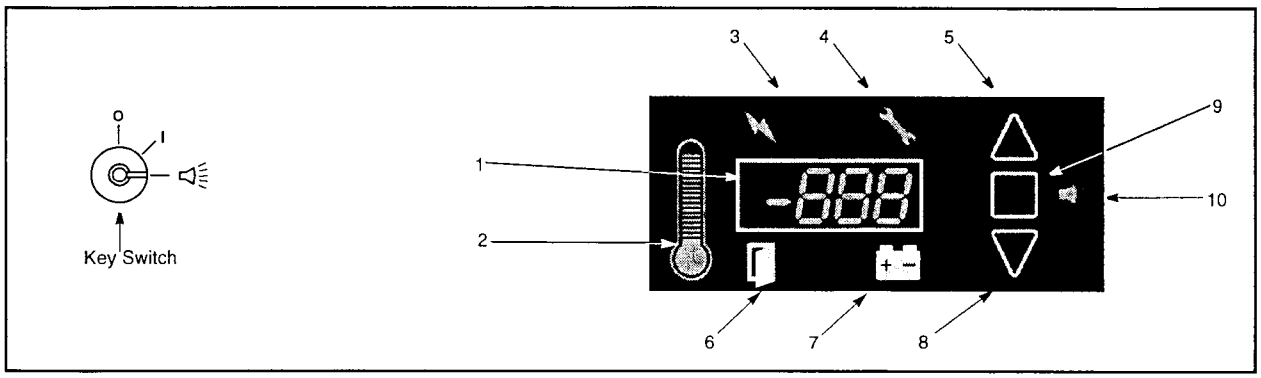


Figure 3. Blood Bank Control Panel

6.1 Control Panel Features

The control panel is located on the top right side of your blood bank refrigerator. You can use the three pushbuttons (#5, #8, and #9 in Figure 3) to change the temperature display (#1) or to adjust temperature and alarm setpoints. The thermometer display (#2) provides a quick visual indicator of current cabinet temperature and alarm conditions.

Before starting up your refrigerator, take some time to review the control panel functions:

1. Main temperature display — during normal operation, shows cabinet temperature in degrees Celsius, as measured by the upper sensor inside the cabinet. You can use the buttons to display other values such as setpoints, extreme values, and lower sensor temperature. The number in the main display flashes when the value can be modified.

2. Thermometer — shows cabinet temperature and alarm conditions. There are 10 horizontal bars: 9 are displayed during normal operation, the tenth (top) bar indicates a warm alarm condition. The number of bars illuminated indicates approximate cabinet temperature. Depending on alarm settings, 4 or 5 bars illuminated indicate that the cabinet is at setpoint.

   For example, suppose that the cabinet temperature setpoint is +4°C and that the warm and cold alarm setpoints are 8°C and 0°C. Then the number of bars illuminated indicates cabinet temperature as follows:

bulb only	0°C (cold alarm)	6 bars	4.8
1 bar	0.8	7 bars	5.6
2 bars	1.6	8 bars	6.4
3 bars	2.4	9 bars	7.2
4 bars	3.2	10 bars	8 (warm alarm)
5 bars	4 (setpoint)		

   When cabinet temperature exceeds the warm alarm setpoint, the top bar of the thermometer flashes. When temperature is lower than the cold alarm setpoint, the bulb flashes.

   When you are in programming mode (described in Table 2) the thermometer shows the setpoint value you are changing.

3. Power failure — illuminated when the main power supply is interrupted. In this case the audible alarm also sounds.

4. Service required —illuminated when the controller is in service programming mode or when simulated warm or cold alarm conditions are failing to occur during an alarm test.

5. Increase — pushbutton used to increase setpoint values in programming mode and for various display functions.

6. Door ajar — illuminated when the refrigerator door is open and the alarm is activated (key switch turned to the alarm position). (This feature is not available for 45 ft^3 sliding glass door models.)

7. Battery low — illuminated when the backup battery is low.

8. Decrease — pushbutton used to decrease setpoint values in programming mode and for various display functions.

9. Scan — pushbutton used to change the main display and for various other functions.

10. Audible alarm — illuminates during warm and cold alarm conditions.

For full descriptions of display, programming, and service functions, refer to Tables 2, 3, and 4 on page 5.

6.2 Display Functions

Table 2. Control Panel Display Functions

Function	Meaning	Sequence	Display
Normal operation	Default display while refrigerator is running	—	Temperature display and thermometer show cabinet temperature.
Cold excursion	Show coldest cabinet temperature since last startup or reset	Press ▽	Display shows cold excursion while button is pressed.
Warm excursion	Show warmest cabinet temperature since last startup or reset	Press △	Display shows warm excursion while button is pressed.
Mute	Silence audible alarm	Press □	Display and thermometer show cabinet temperature, alarm icon continues to flash.
Reset	Return to default display after excursion or alarm condition	Press △ and ▽ simultaneously, hold for five seconds	Excursion values are reset; temperature display shows cabinet temperature.
Alarm test	Test by simulating warm alarm conditions; key switch must be in alarm mode	Press △ and □ simultaneously	Display and thermometer show simulated cabinet temperature, alarms flash and sound as appropriate. Alarms clear when test is completed.
Lower sensor	Display lower cabinet temperature	Press ▽ and □ simultaneously and hold	Display shows lower cabinet temperature while buttons are held, returns to upper cabinet temperature when buttons are released.

6.3 Programming Functions

You can enter programming mode by pressing □ and holding for 5 seconds. Pressing □ repeatedly scrolls through the available setpoint functions: warm alarm and cold alarm.

Table 3. Setpoint Programming Functions

Function	Programming Sequence
Adjust cold alarm setpoint	Enter programming mode by pressing □ and holding for 5 seconds. On release, the current cold alarm setpoint value flashes in the temperature display; use ▽ and △ to adjust it. The display automatically returns to normal operating mode 30 seconds after the last key entry or after scrolling through both available functions.
Adjust warm alarm setpoint	Enter programming mode and press □ repeatedly until the top of the thermometer is illuminated. The current warm alarm setpoint value then flashes in the temperature display; use ▽ and △ to adjust it. The display automatically returns to normal operating mode 30 seconds after the last key entry or after scrolling through both available functions.

6.4 Service Parameters

When the key switch is *not* turned to third (alarm) position, you can access service parameters by entering programming mode and pressing □ for an additional 5 seconds. Pressing □ repeatedly scrolls through the available service functions. While you are in service mode, the wrench icon is illuminated. For any flashing parameter you can use ▽ and △ to adjust the value.

⚠ **CAUTION!** Resetting any of the following parameter values could adversely affect the performance of your blood bank refrigerator. These settings very rarely need to be changed for normal +4°C operation. Be sure to call Revco Service before making any adjustments to service parameter values.

Table 4. Service Parameters

Parameter	Notes	Parameter	Notes
1. Offset	Center air temperature calibration. Default value is 0.	6. Defrost Duration	Range 5 to 30 minutes; default value is 15.
2. Line voltage	Display only.	7. Defrost Termination	Temperature at evaporator at which defrost cycle terminates; default value is 4°C.
3. Cut On	Cabinet temperature at which compressor starts to cool down to setpoint. Default value is 5°C.	8. Short Cycle Delay	Range 0 to 15 minutes; default value is 0.
4. Differential	Cut On – differential = temperature at which compressor stops after achieving cabinet temperature setpoint. Default value is 2.	9. Control Probe Temperature	Display only.
5. Defrost Interval	Range 1 to 12 hours; default value is 1.	10. Defrost Probe Temperature	Display only.

7 Operation

7.1 Start Up

To start up the refrigerator, complete the following steps:

1. Plug in the power cord.
2. Insert the key in the switch and turn the power on.The display will show the actual cabinet temperature.
3. Rotate the power switch to the ALARM ON position when the temperature drops below the warm alarm setpoint.
4. Allow the unit to reach operating temperature before loading it with any product. To stabilize the temperature profile, a 24-hour waiting period is recommended.
5. After the unit has pulled down to the desired operating temperature, turn the three position key switch one turn further clockwise to the Alarm On position.
6. If you have a remote alarm, hook it up at this point (refer to Section 9.3 on page 7).
7. Whether you have a built-in alarm or a customer-installed remote alarm, you should test it following the instructions in Section 9.4 on page 7. Alarm setpoints are factory pre-set for 5.5 and 1.5°C.

7.2 Product Loading Guidelines

When loading your blood bank refrigerator, take care to observe the following guidelines:

- Never load the blood bank beyond capacity. Table 1 on page 1 shows the number of 450ml bags that can safely be stored in your unit.
- Distribute the load as evenly as possible. Temperature uniformity depends on air circulation, which could be impeded if drawers are overfilled, particularly at the top of the cabinet.
- For critical applications such as blood storage, be sure that the alarm systems are working and active before you load any product.

7.3 Automatic Defrost

The defrosting process on all models is primarily accomplished by air circulated during off-cycle periods. All models are equipped with a built-in, on-demand defrost feature which is preset at the factory. The units defrost only under the most severe conditions.

Under normal conditions, the temperature warm-up during defrost is virtually unnoticeable. However, an occasional 2°C warm-up is possible if usage is heavy and ambient conditions are extreme.

8 Temperature Control

8.1 Setpoint Control

Your individual unit has been adjusted and factory tested to maintain a +4°C cabinet temperature. For most blood bank applications, you will not need to change the temperature setpoint.

Cabinet temperature setpoint is a computed value based on the service parameters Cut On and Differential. To adjust the setpoint:

1. Be sure that the key switch is *not* turned to the third (alarm) position. In order to protect the contents of the blood bank, access to service parameters is disabled when the unit is in alarm mode.
2. Access the service parameters as shown in Table 4 on page 5.
3. Adjust the values of Cut On and Differential as needed.

8.2 Sensor Bottles

Cabinet temperature is measured by probes inserted in sensor bottles. The bottles contain equal portions of glycerine and water to simulate blood samples. Keep the sensor bottles completely full up to the top of the bottle.

Space Saver models have one factory-installed sensor bottle. In Upright models (23 ft^3 and larger) there are two sensor bottles, positioned as shown in Figure 4.

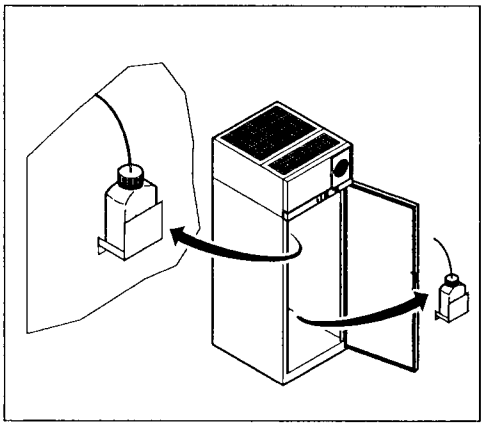


Figure 4. Sensor Bottles (Upright Models)

The default sensor reading for Upright units is the bottle at the top of the cabinet. You can check the temperature in the lower sensor bottle by pressing and holding ∇ and □ simultaneously (refer to Figure 3 on page 4). When you release the buttons, the temperature display returns to the upper sensor reading.

9 Alarm Systems

9.1 Operating the Alarm

The alarm system is designed to provide visual and audible warning signals for both power failure and rise in temperature. The alarm is equipped with a battery backup.

The factory default warm alarm setpoint is 5.5°C; the default cold alarm setpoint is 1.5°C.

The alarm system is activated only when the key switch is turned to the Alarm On position. The audible warning signal sounds when there is a power failure or temperature alarm condition, or when the door is ajar for more than 2 minutes.

The Mute function (pressing the □ button) allows you to turn off the audio warning without turning off the visual indicators.

To turn off and reset flashing visual alarms, press Δ and ∇ simultaneously.

There is also a ringback function after approximately 6 minutes if any alarm condition remains active.

9.2 Local and Remote Alarms

Blood bank units can have either a factory-installed local alarm or an optional user-installed remote alarm. Operating and testing procedures are the same for both types of alarm.

The maximum distance between a blood bank and a remote alarm depends on the wire gauge used. Refer to Table 5 below.

Table 5. Wire Gauges and Distance to Remote Alarm

Wire Gauge	Total Wire Length (feet)	Distance to Alarm 1/2 Wire Length (feet)
20	530	265
18	840	420
16	1,330	665
14	2,120	1,060
12	3,370	1,685

9.3 Installing a Remote Alarm (Optional)

Remote alarm terminals are located at the rear of the machine compartment. The terminals are: Common, Open on Fail (Normally Closed), and Close on Fail (Normally Open).

1. The remote alarm system has two keyhole slots on the back to hang the alarm system on the wall. Insert two screws, no longer than a #12 truss-head type and spaced two inches apart, into a wall and mount the alarm.
2. Make the following connections:
   a. Connect the common terminal on the cabinet switch to the purple wire on the alarm.
   b. Connect the normally closed terminal on the cabinet to the black ("open on fail") wire on the alarm. This connection gives an alarm when the switch contacts open.
3. Plug the alarm system service cord into an electrical outlet. This alarm is designed for 115V/60 Hz, 115V/50 Hz, or 100V/50 Hz operation.

Note: *If you want the alarm signal to sound when the switch contacts* ***close****, connect the normally open terminal on the cabinet to the red/white ("close on fail") wire on the alarm. The purple and red/white wires must be tied together in this application.*

The wiring diagram is attached to the inside of the alarm back cover.

9.4 Alarm Test

Note: *It is important to test your alarm system after any maintenance operation or temperature control adjustment.*

9.4.1 Theory of Operation

This test procedure applies to both factory-installed built-in alarms and optional field-installed remote alarms.

During the alarm test, the temperature sensor is artificially heated and cooled by a tiny, built-in thermoelectric heating and cooling unit which simulates both warm and cold conditions. The electronic control module notes the sensor temperature changes and the control panel displays these changes.

While this alarm testing procedure is very accurate and reliable, the temperature of the refrigerated space does not change during the alarm test.

9.4.2 Alarm Test Procedure

Note: *This test automatically advances through all steps and stops.*

1. Verify that the key position is in the alarm mode, and that the current warm and cold alarm setpoints are within normal ranges (the warm and cold simulations may not work if the setpoints are set to extreme values).
2. To start the alarm test, press Δ and □ simultaneously. During the test the main display and thermometer bulb will indicate simulated (not actual) cabinet temperature.
3. When simulated temperature exceeds the warm alarm setpoint, the alarm sounds and the alarm icon on the control panel illuminates (#10 in Figure 3 on page 4).
4. The temperature display begins to drop. After a few seconds, the temperature in the display is back in the operating range.
5. The alarm stops. The temperature on the display drops until the cold alarm sounds.
6. The test is now complete but the alarm continues to sound until the temperature on the display is back in the operating range.

If the simulated alarm conditions do not occur during the first 10 minutes of the alarm test, the service (wrench) icon illuminates and the test is terminated. When during the alarm test, the temperature display does not change or the service icon illuminates, check the sensor connections.

10 Chart Recorders

Panel-mounted six inch recorders are standard and factory-installed on all models except for undercounter models, for which free-standing recorders are available as options.

Recorder operation begins when the system is powered on.

10.1 Set Up and Operation

To prepare the recorder to function properly, complete the following steps:

1. Open the recorder door to access the recorder.
2. Connect the nine volt DC battery located at the recorder's upper right corner. This battery provides back-up power.
3. Install clean chart paper (refer to Section 10.3 below).
4. Remove the plastic cap from the pen stylus and close the recorder door.

Note: *The recorder may not respond until the system reaches temperatures within the recorder's range.*

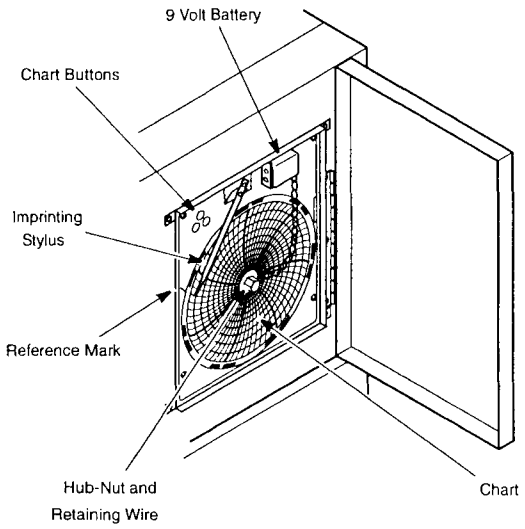


Figure 5. Six Inch Chart Recorder

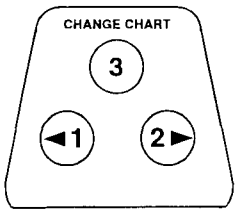


Figure 6. Chart Buttons

10.2 Power Supply

The recorder normally uses AC power when the system is operating. If AC power fails, the LED indicator flashes to alert you to a power failure. The recorder continues sensing cabinet temperature and the chart continues turning for approximately 24 hours with back-up power provided by the nine-volt battery.

The LED indicator glows continuously when main power is functioning and the battery is charged.

When the battery is low, the LED flashes to indicate that the battery needs to be changed.

10.3 Changing Chart Paper

To change the chart paper, complete the following steps:

1. Locate the pressure sensitive buttons at the front, upper left of the recorder panel.
2. Press and hold the change chart button for one second. The pen will move off the scale.
3. Unscrew the center nut, remove the old chart paper, and install new chart paper. Carefully align the day and time with the reference mark on the recorder panel (a small groove on the left side of the panel, shown in Figure 5).
4. Replace the center nut and hand tighten. Press the change chart button again to resume temperature recording.

10.4 Calibration Adjustment

This recorder has been accurately calibrated at the factory and retains calibration even during power interruptions. If required, however, adjustments can be made as follows:

1. Run the unit continuously at the control setpoint temperature. Continue steady operation for at least two hours to provide adequate time for recorder response.
2. Measure cabinet center solution temperature with a calibrated temperature monitor. (Solution temperature is measured inside the sensor bottles — see Section 8.2.)
3. Compare the recorder temperature to the solution temperature. If necessary, adjust recorder by pressing the left (#1) and right (#2) chart buttons.

Note: *The stylus does not begin to move until the button is held for five seconds.*

11 Cleaning

11.1 Cleaning the Drawers and Cabinet Interior

To clean the drawers and cabinet interior, remove the drawers following the instructions in Section 5. Use a solution of water and a mild detergent. Rinse the drawers and wipe them dry with a soft cloth.

11.2 Cleaning the Condenser

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

CAUTION! Condensers should be cleaned at least every six months. In heavy traffic areas, condensers load with dirt more quickly. Failure to keep the condenser clean can result in equipment warm-up or erratic temperatures.

CAUTION! Never clean near condensers with your fingers. Some surfaces are sharp.

Periodically check the condenser to make sure that it is clean.

In all models, the condenser is located in the top machine compartment. To clean the condenser:

1. Disconnect the power.
2. Remove the top grill.
3. Use a vacuum cleaner with hose and brush attachments to clean the front face of the finned surface.
4. Clean up any loose dust and replace the grill.
5. Reconnect the power.

12 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

This section is a guide to troubleshooting equipment problems.

Table 6. Troubleshooting Procedures

Problem	Cause	Solution
Unit does not operate or Power Failure Indicator is on.	Power supply	1. Check that the cord is securely plugged in. 2. Plug another appliance into the outlet to see if it is live. 3. Test the voltage and verify that it is correct for your unit (refer to Table 1 on page 1). 4. If the outlet is dead, check the circuit breaker or fuses.
Temperature fluctuates.	Cold control	Make sure that the cold control is set correctly. Refer to Section 8 on page 6.
	Condenser	Make sure the condenser is clean. Refer to Section 11.2 on page 9.
	Other causes	If the cold control is set correctly, the condenser is clean, but temperature continues to fluctuate, call an authorized Revco service representative.
Unit warms up.	Door is open	Make sure the door is completely closed.
	Door seal	Check the door seal, following instructions in Section 4.5 on page 3.
	Warm product recently loaded in unit	Allow ample time to recover from loading warm product.
	Power supply	Check for proper voltage to the unit. If there is no voltage to the unit, call an electrician.
	Compressor	1. If the compressor is not running and the power failure alarm light is on, have an electrician check for proper voltage to the unit. 2. If the compressor is not running and the power failure alarm light is off, call the technical support hot line. 3. If the compressor is running, open the door and look through the slotted air intake in the bottom of the evaporator cover to see if icing is present on the evaporator. If icing is present and there is no air flow behind evaporator, call technical service for assistance. The evaporator fans may be inoperative. 4. If the compressor is running and there is airflow behind the evaporator, contact an authorized service provider or call the technical support hot line for assistance.

13 Optional Accessories

Remote Alarm. Optional for all blood bank models.

Description	Catalog No.
Standard Remote Alarm. Provides audible and visual signal in the event of temperature rise or power failure. Adaptable to telephone switchboard. Can be located up to 1/3 mile (1760 ft/536 m) from cabinet. Must be used with electronic alarm system and connected to normally-open or normally-closed remote alarm contacts. Wire not included. Specify voltage when ordering.	5612
Deluxe Electronic Remote Alarm System. User programmable to sound alarm in the event of temperature rise or power failure. Can dial up to four telephone numbers to advise of alarm condition across any telephone system which accepts pulse dialing. One system can monitor up to four individual cabinets. In addition, the system can monitor up to three groups of cabinets. Contact Revco for detailed specifications. Customer installed.	6224

Temperature Recorders

All six inch recorders use pressure-sensitive chart paper (1 box @ 50 charts included); no inking is required. Four inch recorders use inked marker pens.

Description	Catalog No.
Temperature recorder, 6 in. circular chart, seven-day drive, free-standing. Customer installed. Specify voltage when ordering.	6383-7

Chart Paper

Description	Catalog No.
Chart paper, package of 50, for six inch, seven-day recorder, -40°C to +25°C.	6184
Chart paper, package of 50, for four inch, seven-day recorder, -40°C to +50°C.	6198

Low Voltage Protection

Description	Catalog No.
Voltage Safeguard. Free-standing. Helps protect electrical equipment from damage by boosting low voltage automatically. Provided with terminal board for direct wiring. Field installed. Specify voltage when ordering.	5575

Casters

Description	Catalog No.
Caster Dolly. For use with 4.9 cu.ft and 11.5 cu.ft cabinets.	6174
Dual-Wheel Casters. Set of four, 2 in. diameter, for 23.3, 29.2, and 51.1 cu.ft models only.	6041

14 Warranty

14.1 Domestic Warranty
13 Months Full Warranty, Parts and Labor
United States of America and Canada

Revco Scientific, Inc. warrants this product to the owner for a period of thirteen (13) months from date of shipment by Revco Scientific, Inc. Under this warranty, Revco, through its authorized service organizations, will repair, or at its option, replace any part found to contain a manufacturing defect in material or workmanship without charge to the owner for parts, service labor, or any shipping or cartage costs. Replacement or repaired parts will be warranted for only the unexpired portion of the original warranty. This warranty is limited to products purchased and installed in the United States of America and Canada. It does not apply to damage caused by accident, misuse, fire, flood, or acts of God. It does not apply to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

To obtain prompt warranty service, simply contact the nearest authorized service center or dealer listed in the directory enclosed with each product. Revco's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Revco's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

14.2 International Warranty
16 Month Parts Warranty

Revco Scientific, Inc., warrants this product to the owner for a period of sixteen (16) months from the date of shipment by Revco. If any part is found to contain a manufacturing defect in material or workmanship, Revco assumes no responsibility for any labor expenses for service, removal, or reinstallation required to replace part, or for incidental repairs, and such costs are the responsibility of the Owner unless a service labor agreement exists between the Owner and his Dealer.

The warranty does not apply to damage caused by accident, misuse, fire, flood, or acts of God, or to defects resulting from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

To obtain prompt warranty service. simply contact the Dealer from whom you purchased the product or the nearest Dealer handling Revco products. Revco's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Revco's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

14.3 Extended Warranty Options

In addition to Revco's standard 13-Month full warranty on the complete product (USA and Canada), Revco can supply an additional four year protection on compressor and compressor parts. This additional coverage must be purchased at the time of original product purchase. Under this contract, Revco Scientific agrees to furnish a compressor FOB our factory to replace one which has been determined to be defective by Revco or a factory authorized Revco Service Agency.

Description	Catalog No.
Extended Four-Year Compressor Parts Contract, all refrigerators.	6069
Extended 12-Month Comprehensive Coverage, for all models, provides additional 12-month warranty coverage, parts and labor. Contact Revco for details.	6613

Harris Mfg.
P-H Div.

Blood Bank Refrigerator

Operators Manual

34830H09

© June, 1996 Harris/P-H
All rights reserved
Printed in U.S.A

Table of Contents

1 Introduction **1**

1.1 Features and Benefits 1

1.2 Specifications 2

1.3 Recorder 2

1.4 Controller 3

1.5 Monitor 3

2 Safety Considerations **5**

3 Installation **7**

3.1 Unloading 7

3.2 Inspection 7

3.3 Storage 7

3.4 Unpacking 7

3.5 Location 8

3.6 Wiring 8

3.6.1 110 VAC Installation 9

3.6.2 230 VAC Installation 10

3.7 Leveling 11

3.8 Remote Alarm 11

3.8.1 Remote Alarm Terminals 11

3.8.2 Installation 12

3.9 Alarm Test 13

3.9.1 Theory of Operation 13

3.9.2 Alarm Test Procedure 13

3.10 Recorder 14

3.10.1 Set-Up and Operation 14

3.11 Drawers 14

3.11.1 Removing the Drawers 15

3.11.2 Reinstalling the Drawers 15

3.11.3 Changing Drawer Slide Position 16

3.12 Door Seal 16

3.13 Final Checks 16

4 Monitoring and Control Panels 17

4.1 Monitoring Panel Functions 17

4.1.1 Key-Operated Power and Alarm Switch 17

4.1.2 Interior Light Switch 17

4.1.3 Warning Indicator Lights 17

4.1.4 Temperature Display Window 18

4.1.5 Audio Alarm Silence Button 18

4.1.6 Alarm Test Button 18

4.1.7 Sensor Selector Button 18

4.2 Control Panel Functions 19

4.2.1 Adjustment Arrows 19

4.2.2 Temperature Display Unit 19

4.2.3 SET Button 19

4.2.4 Evaporator Air Temperature 19

4.3 Recorder Functions 20

4.3.1 9 Volt Battery 20

4.3.2 Chart Imprinting Stylus 20

4.3.3 Chart Pager Hub-Nut with Retaining Wire 20

4.3.4 Chart Paper 20

5 Operation 21

5.1 Temperature Setting 21

5.2 Start Up 22

5.3 Usage and Performance 22

5.4 Automatic Defrost 22

5.5 Remote Alarm 23

5.5.1 Operating the Alarm 23

5.6 Recorder 23

6 Maintenance 25

6.1 Cleaning 25

6.1.1 Drawers 25

6.1.2 Condenser 25

6.2 Recorder 27
6.2.1 Power Supply 27
6.2.2 Changing the Chart Paper 28
6.2.3 Calibration Adjustment 28
6.3 Door Gasket 29
6.3.1 Removing the Door Gasket 30
6.3.2 Installing the Door Gasket 30
6.4 Sensor Bottles 30
7 Troubleshooting 31
8 Accessories 33
9 Warranty 35
9.1 Domestic Warranty 12 Months Full Warranty, Parts and Labor United States of America and Canada 35
9.2 International Warranty 16 Months Parts Warranty 35
9.3 Extended Warranty Options 36
10 Diagrams 37

List of Figures

Figure: 1. Blood Bank Refrigerator 1
Figure: 2. Blood Bank Recorder 2
Figure: 3. Temperature Controller 3
Figure: 4. Monitoring Panel 3
Figure: 5. Blood Bank Refrigerator Rear View (shows 230 Volt service in use) 9
Figure: 6. Rear Grill Removal for 230 VAC Installation 10
Figure: 7. Remote Alarm 11
Figure: 8. Drawer Removal 14
Figure: 9. Monitoring Panel 17
Figure: 10. Control Panel 19
Figure: 11. Recorder 20
Figure: 12. Top Grill Removal 26
Figure: 13. Recorder 27
Figure: 14. Door Gasket 29
Figure: 15. Sensor Bottles 30
Figure: 16. Piping Diagram 37
Figure: 17. Dimension Diagram 38

List of Tables

Table 1. Blood Bank Refrigerator Specifications 2
Table 2. Wire Gauges 12
Table 3. Maintenance Schedule 25
Table 4. Troubleshooting Procedures 31
Table 5. Accessories 33

1 Introduction

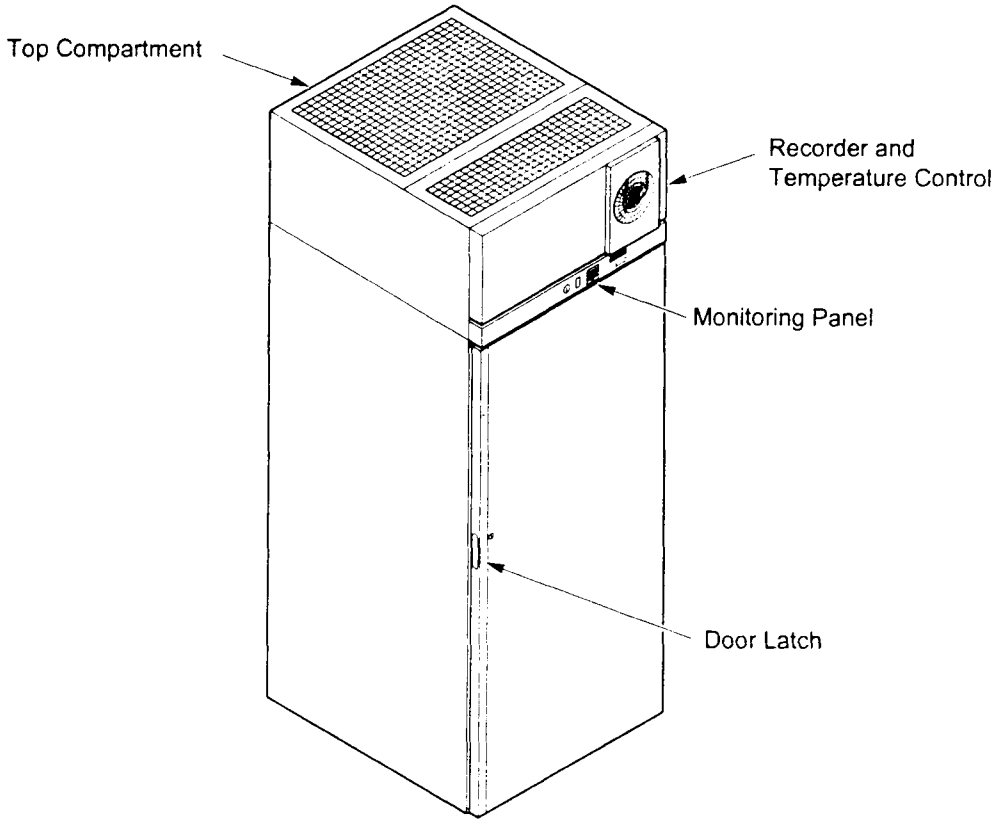


Figure 1. Blood Bank Refrigerator

1.1 Features and Benefits

- Seven sliding drawers, each with a capacity of 77, 450ml bags.
- Standard cold and warm alarm systems.
- Contacts for remote alarm installation.
- Electronic temperature controller.
- Superior temperature uniformity.

1.2 Specifications

Table 1. Blood Bank Refrigerator Specifications

Product		Blood Bank Refrigerator
Dimensions W x H x D in. (cm)	Interior	30 x 58 x 28.5 (76.2 x 147.3 x 72.4)
	Exterior	34 x 79.5 x 36.2 (86.4 x 202 x 91.9)
Shipping	Base	39 in. (F-B) x 41 in. (across front) (99.1 x 104.1 cm)
	Height (approximate)	83 in. (210.8 cm)
	Weight (approximate)	665 lb (302 kg)
Power	Requirements	110 and 230 V; 50 and 60 Hz
	Consumption	18 kilowatts per day under normal operating conditions
Environmental	Operating Temperature	2 to 4°C at 15 to 35°C ambient temperature
	Shipping and Storage Temperature	50 to 100°F 10 to 50% relative humidity
Capacity	Maximum Load	qty. 539, 450ml blood bags
	Minimum Load	N/A
Material	Body	Stainless Steel
	Drawers and Shelves	Stainless Steel

1.3 Recorder

Refer to Section 4.3 on page 20 for additional information.

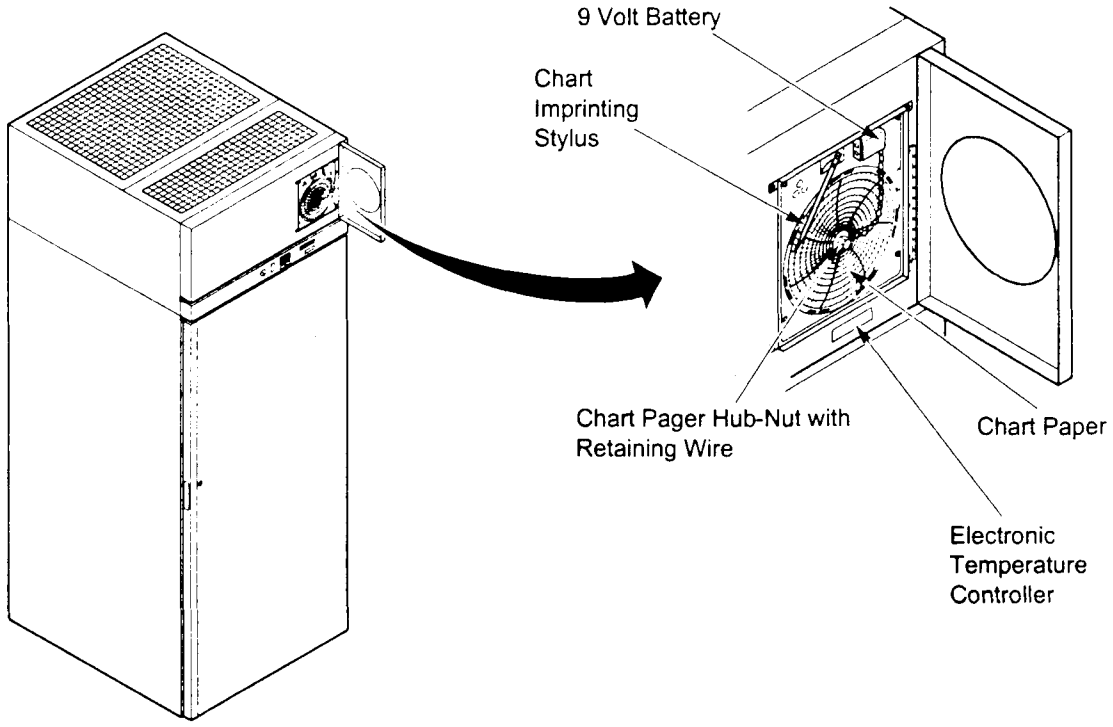


Figure 2. Blood Bank Recorder

1.4 Controller

Refer to Section 4.2 on page 19 and Section 5.2 on page 22 for additional information.

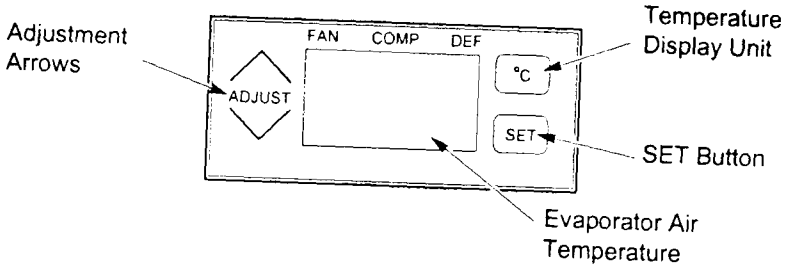


Figure 3. Temperature Controller

1.5 Monitor

Refer to Section 4.1 on page 17 for additional information.

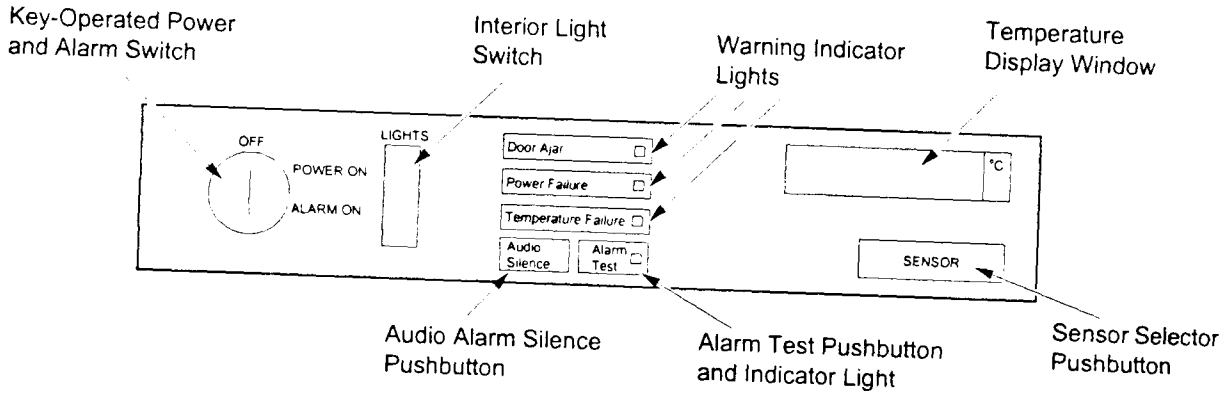


Figure 4. Monitoring Panel

This Page Intentionally Left Blank.

2 Safety Considerations

WARNING! Do not modify or use equipment in a manner other than expressly intended. Modification of equipment other than that for which it is explicitly designed could cause severe injury or death. Any customer after-market retrofit violates the warranty of the equipment.

Do not reconfigure the controller. Any reconfiguration of the control instrument could cause inaccurate readings, faulty instrument values, and may cause the unit to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not modify or disconnect any safety features provided. Disconnection of the unit safety features could allow the unit to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not use components or materials not specifically designed for this equipment. Failure to comply with this precaution could result in damage to equipment used or the furnace and may create an overheat situation. Also, do not use anything other than OEM exact replacement equipment and parts. Not using OEM replacement parts could cause faulty instrumentation readings, inoperable equipment, or temperature overshoot. Both situations may cause personal injury or death, product, and property damage.

Before using, user shall determine the suitability and integrity of the product for the intended use and that the unit has not been altered in any way. Misapplication may compromise the safety of the end user or the life of the product.

CAUTION! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

WARNING! Disconnect unit from main power before attempting any maintenance to equipment or controls.

CAUTION! Improper operation of the equipment could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within design limits noted on the dataplate.

3 Installation

3.1 Unloading

Always be sure that the cabinet is kept in the upright position. Do not drop it or lay it on its side.

When moving the crated cabinet, lift it with a fork lift in the areas marked "Fork Here" on the corrugated container.

Do not use clamps or hand trucks to move the container from the carrier.

3.2 Inspection

Upon delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.

If there is no exterior damage, unpack and inspect the equipment within five days of delivery, following the unpacking instructions in Section 3.3 below. If you find any damage, keep the packing materials and immediately report the damage to the carrier. **Do not return goods to Harris/P-H without a written authorization.** When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

3.3 Storage

If you are storing the unit prior to unpacking and installation, be sure that the ambient temperature range at the storage location is 50° to 100°F with relative humidity between 10% and 50%. Do not store items on top of the corrugated container.

3.4 Unpacking

To unpack the unit:

1. A team of three people is recommended for unpacking. The cabinet is heavy.
2. Remove the corrugated top.
3. Carefully cut the carton on the back at the dotted line. Cutting deeper than 1/2" into the corrugated container could result in damage to the cabinet.
4. Remove the carton from the unit.
5. Remove internal packing material and shelving from the inside of the cabinet.
6. Remove the wooden base by extracting the bolts from the cabinet base. Carefully slide the cabinet off the base.

3.5 Location

Install the unit in a level area free from vibration with a minimum of three inches of space on the sides and rear and 12 inches at the top.

Do not position the equipment in direct sunlight or near heating diffusers, radiators, or other sources of heat. The ambient temperature range at the location must be 59° to 95°F with relative humidity between 10% and 50%.

3.6 Wiring

Do not exceed the electrical and temperature ratings.

CAUTION! Connect the equipment to the correct power source. Incorrect voltage can result in severe damage to the equipment.

CAUTION! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

Always connect the equipment to a dedicated (separate) circuit. Electrical codes require fuse or circuit breaker protection for branch circuit conductors. Use time delay fuses or circuit breakers for #12 AWG circuits.

The unit has an internal fuse block used for installations with 230 VAC service. ***This fuse block is in addition to, and does not replace, the external time delay fuses or circuit breakers that are required for all installations.***

Refer to Section 3.6.1 on page 9 for 110 VAC installation instructions and Section 3.6.2 on page 10 for 230 VAC installation instructions.

3.6.1 110 VAC Installation

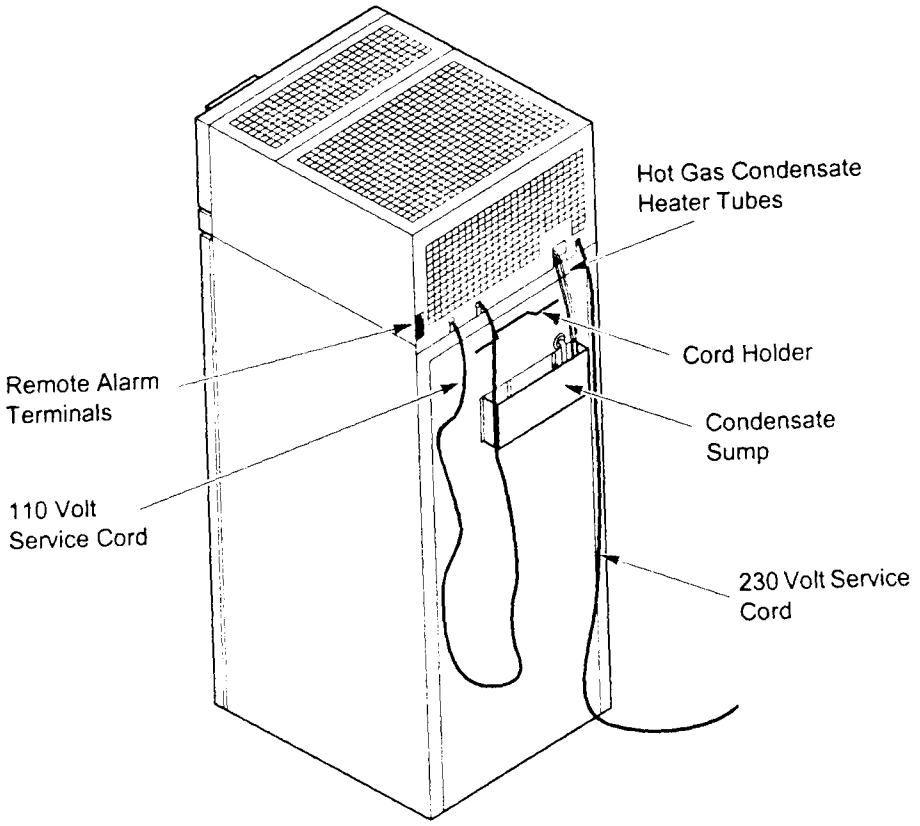


Figure 5. Blood Bank Refrigerator Rear View
(shows 230 Volt service in use)

1. Unwrap the 110 VAC power cord from the cord holder.
2. Plug the 110 VAC power cord into the power supply.

3.6.2 230 VAC Installation

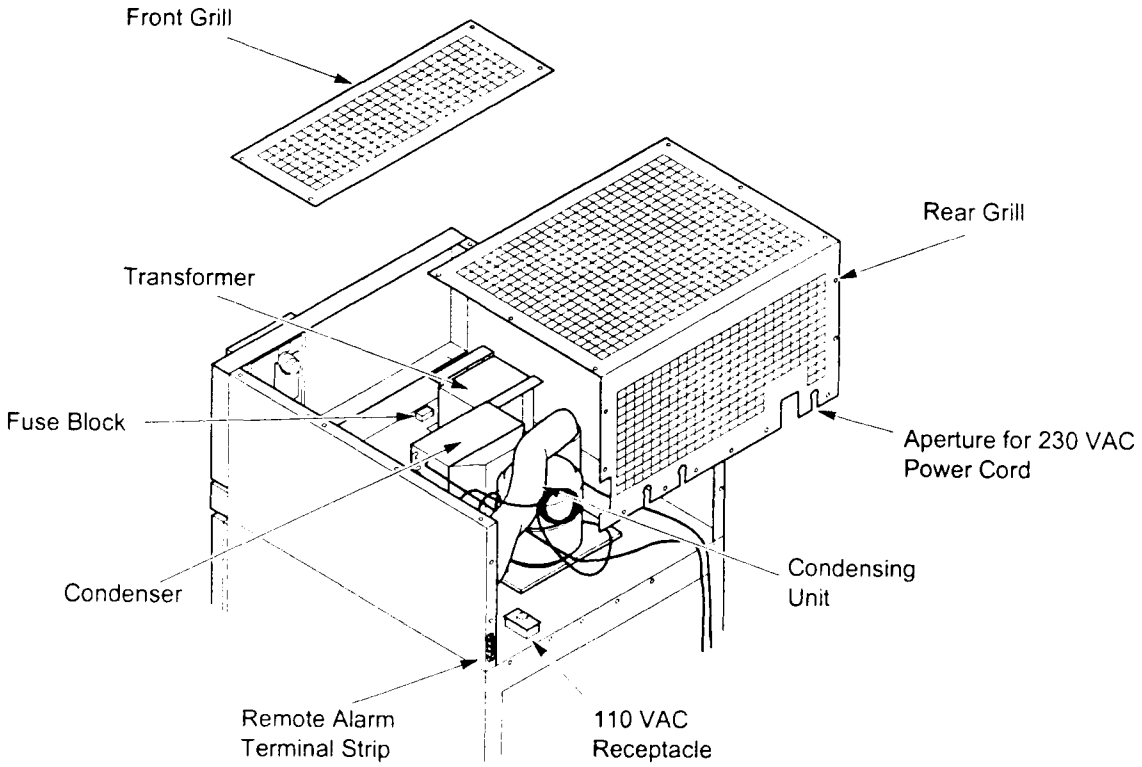


Figure 6. Rear Grill Removal for 230 VAC Installation

1. Remove the rear grill screws at the back and side and open the rear grill (refer to Figure 6).
2. Unwrap the 110 VAC power cord from the cord holder and plug it into the 110 VAC receptacle (shown above in Figure 6).
3. Uncoil the 230 VAC power cord and run it through the aperture on the right side of the rear grill.
4. Replace the rear grill.
5. Plug the 230 VAC power cord into the power supply.

3.7 Leveling

The unit must be level. Rotate the leveling screws, located under the front corners of the unit, until the unit is level. If the floor is seriously out of level, you may need to shim the corners with thin sheets of metal.

Note: *Use thin sheets of metal to level units equipped with optional casters.*

3.8 Remote Alarm

3.8.1 Remote Alarm Terminals

Remote alarm terminals are located at the rear of the machine compartment (refer to Figure 5 on page 9). The terminals are: Common, Normally Closed, and Normally Open.

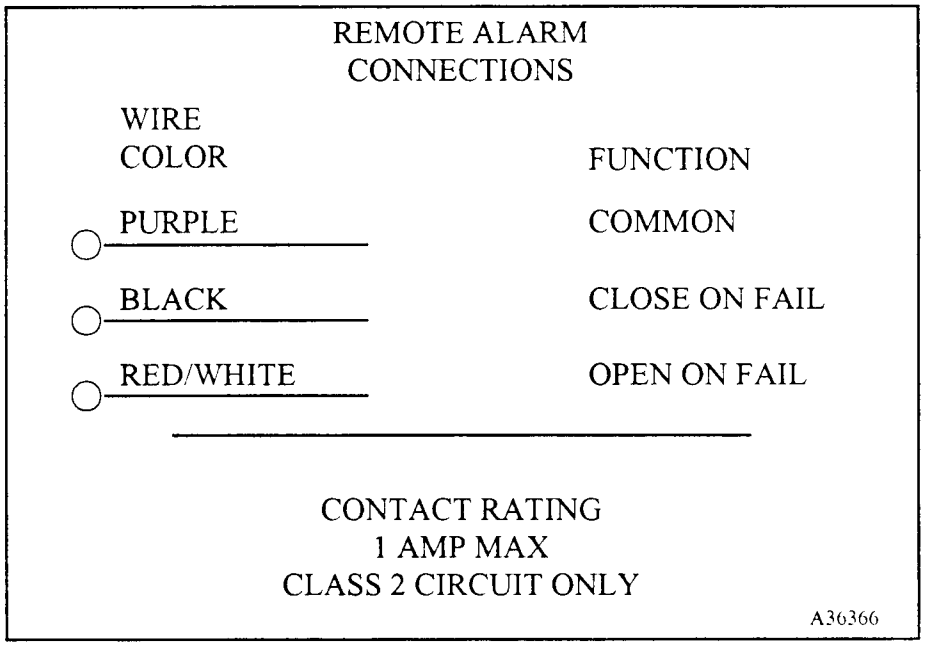


Figure 7. Remote Alarm

3.8.2 Installation

Note: *The remote alarm system has two keyhole slots on the back to hang the alarm system on the wall.*

To install the remote alarm, complete the following steps:

1. Insert two screws, no longer than a #12 truss-head type, spaced two inches apart, into a wall.
2. Mount the alarm.
3. Refer to Figure 7 on page 11 to make the following connections:
   a. Connect the Common terminal on the cabinet switch to the orange wire on the alarm.
   b. Connect the Normally Closed terminal on the cabinet to the red wire on the alarm. This connection sounds an alarm when the switch contacts open.

Note: *If you require the alarm signal when the switch contacts close, connect the Normally Open terminal on the cabinet to the black wire on the alarm. In this application, the orange and red wires must be tied together.*

Table 2. Wire Gauges

Wire Gauge	Total Wire Length (feet)	Distance to Alarm 1/2 Wire Length (feet)
20	530	265
18	840	420
16	1,330	665
14	2,120	1,060
12	3,370	1,685

4. Plug the alarm system service cord into an electrical outlet. This alarm is designed for 115V/60 Hz, 115V/50 Hz, 100V/50 Hz operation.

Note: *The wiring diagram is attached to the inside of the alarm back cover.*

3.9 Alarm Test

3.9.1 Theory of Operation

The alarm test checks the artificially heated and cooled temperature sensor. A tiny, built-in thermoelectric heating and cooling unit simulates both warm and cold conditions. The electronic monitoring module notes the sensor temperature changes and the LED displays these changes.

3.9.2 Alarm Test Procedure

Note: *This test automatically advances through all steps and stops.*

When the unit is in operating temperature range, press and release the Alarm Test button (refer to Figure 4 on page 3). The following sequence occurs:

1. The LED indicator to the right of the button lights and the temperature on the display rises to the alarm temperature.
2. The alarm sounds and the LED indicator beside the Temperature Failure box lights.
3. The temperature display begins to drop. After a few seconds, the temperature in the display is back in the operating range.
4. The alarm stops. The temperature on the display drops until the cold alarm sounds.
5. The test is now complete but the alarm continues to sound until the temperature on the display is back in the operating range.

Note: *While this alarm testing procedure is very accurate and reliable, the temperature of the refrigerated space does not change during the alarm test.*

Refer to Section 5.5 on page 23 for additional information.

3.10 Recorder

3.10.1 Set-Up and Operation

To set-up the factory-installed recorder, complete the following steps:

1. Open the recorder door to access the recorder.
2. Connect the 9 VDC battery located at the recorder's upper right corner. This battery provides back-up power.
3. Install clean chart paper (refer to Section 6.2.2 on page 28).
4. Remove the plastic cap from the pen stylus and close the recorder door.

Note: *The recorder may not respond until the system reaches temperatures within the recorder's range. Refer to Section 6.2 on page 27 for additional information.*

3.11 Drawers

The drawer slides are adjustable. You can position these slides in the vertical slots which are spaced at one-inch intervals.

CAUTION! Drawer slides do *not* require lubrication. Additional lubricant could impede movement of the drawers when the lubricant is cold.

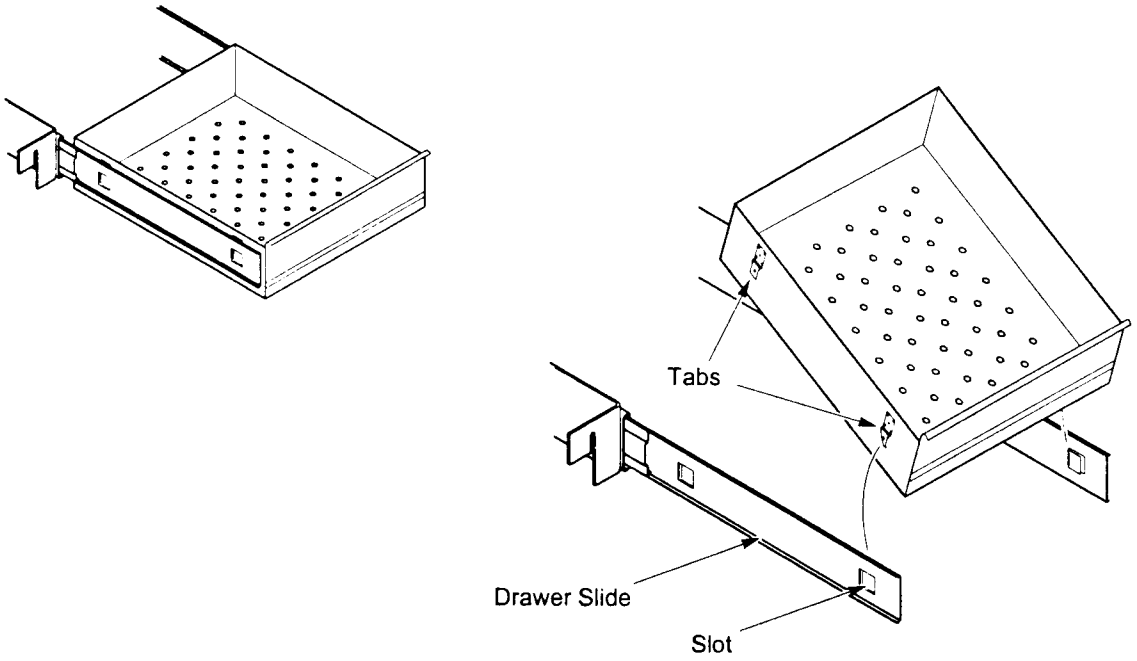


Figure 8. Drawer Removal

3.11.1 Removing the Drawers

To remove the drawers, complete the following steps (refer to Figure 8):

1. Pull the drawer toward you until the slides are fully extended.
2. Lift the back of the drawer to disengage the mounting tabs from the slots on the slides.

Note: *The drawers fit snugly between the slides. Push the back of the drawer from underneath to remove the drawer.*

3. Raise the back of the drawer almost to a vertical position and disengage the front mounting clips from the slides.

3.11.2 Reinstalling the Drawers

To reinstall the drawers, complete the following steps (refer to Figure 8):

1. Pull both drawer slides toward you until the slides are fully extended.
2. Position the drawer between the slides and insert the front mounting clips into the slots on front of the slides.
3. Push the back of the drawer down between the slides and insert the drawer tabs into the back slots.

Note: *The drawers fit snugly between the slides. Push on the back of the drawer from the inside to insert the drawer tabs completely into the slots. Make sure both drawer tabs are aligned with the slots on the slides before pushing the drawer down between the slides.*

3.11.3 Changing Drawer Slide Position

Drawer slides have a small wire safety clip at the front pilaster which prevents the slides from falling when the drawers are removed. To change the position of the drawer slides, complete the following steps:

1. Locate the safety clip.
2. Slip your fingernail or a small screwdriver under the bottom of the wire clip and pry the clip out toward the inside of the refrigerator.
3. Lift up the slide at the front. The slide is free to move from the front pilaster.

   The drawer slide must be removed from the rear pilaster at approximately a 45 degree angle toward the center of the cabinet.
4. Pull the slide toward the front of the cabinet.

3.12 Door Seal

To check the door seal, complete the following steps:

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4-inch intervals around the door. If the door does not seal properly, call service personnel to replace the gasket.

DANGER: Door seal integrity is critical for refrigerators and freezers. A loose fitting gasket allows moist air to be drawn into the cabinet, resulting in quicker frost buildup on the evaporator coil, longer running time, poor temperature maintenance, and increased operation cost.

3.13 Final Checks

Before start up, complete the following steps:

1. Make sure that the unit is free of all wood or cardboard shipping materials, both inside and outside.
2. Verify that the unit is connected to a dedicated circuit.

CAUTION! Connect the equipment to a separate, dedicated, power source. Power fluctuations can result in severe damage to the equipment.

4 Monitoring and Control Panels

4.1 Monitoring Panel Functions

Refer to Figure 9 for an illustration of the monitoring panel indicators and buttons.

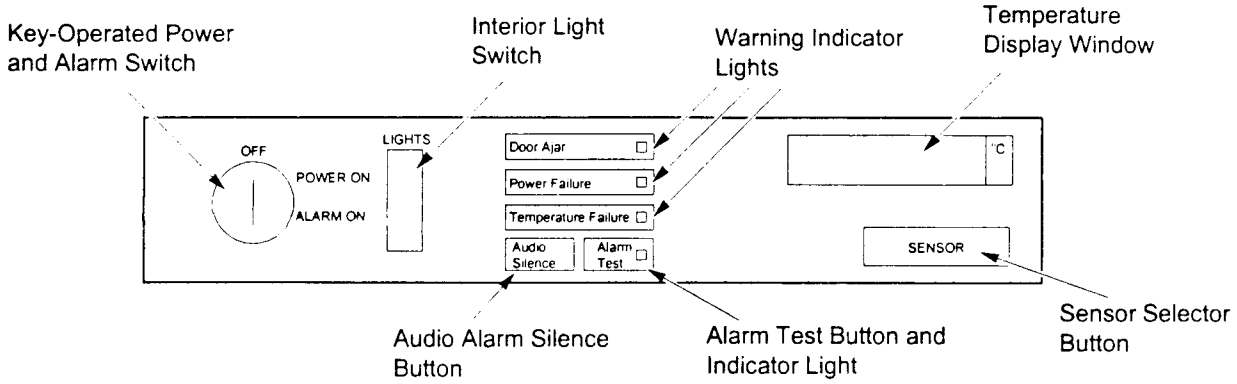


Figure 9. Monitoring Panel

4.1.1 Key-Operated Power and Alarm Switch

This switch applies power to the refrigerator and activates the alarm.

4.1.2 Interior Light Switch

This switch activates the interior light when the refrigerator door is closed.

4.1.3 Warning Indicator Lights

4.1.3.1 Power Fail LED

This light indicates that the AC power has failed and that the monitoring panel functions and the alarm are operating on battery power. To display the cabinet temperature, press and hold the Audio Silence button. When the button is released, the display goes blank to conserve battery power.

CAUTION! If the equipment experiences a power failure, have a certified electrician check the power supply before operating the equipment.

4.1.3.2 Temperature Failure LED

This light indicates that the sensor is reading a cabinet temperature in the alarm zone.

4.1.3.3 Alarm Test LED

This light indicates that the automatic alarm test is in progress.

4.1.4 Temperature Display Window

This window displays the cabinet temperature during normal operation and the temperature in the lower portion of the cabinet when the Sensor Selector Button is depressed (refer to Section 4.1.7).

4.1.5 Audio Alarm Silence Button

This button silences the audible alarm indication. The alarm indicator light will continue to illuminate.

4.1.6 Alarm Test Button

This button activates the Alarm Test Procedure (refer to Section 3.9.2 on page 13).

4.1.7 Sensor Selector Button

This button allows the monitoring panel to sense the temperature in the lower portion of the cabinet. Press, hold, and release this button and the Temperature Display Window will display the temperature in the lower portion of the cabinet.

4.2 Control Panel Functions

Refer to Figure 10 for an illustration of the control panel indicators and buttons. Refer to Section 5 starting on page 21 for Control Panel operation procedures.

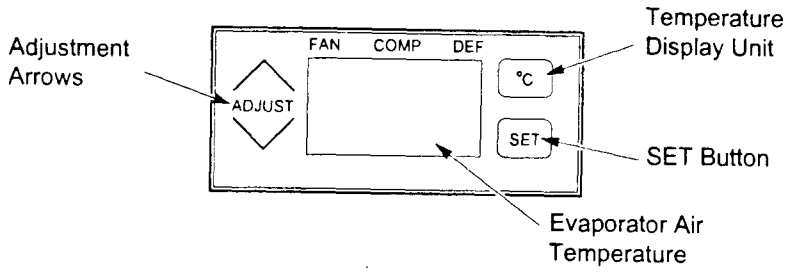


Figure 10. Control Panel

4.2.1 Adjustment Arrows

The up arrow ^ increases values. The down arrow v decreases values.

4.2.2 Temperature Display Unit

This display indicates if the temperature is shown in Fahrenheit or Celsius units.

4.2.3 SET Button

This button allows control setpoint adjustment (refer to Section 5.1 on page 21 for additional information).

4.2.4 Evaporator Air Temperature

This red LED display normally shows the evaporator air temperature inside the refrigerator.

4.3 Recorder Functions

Refer to Figure 11 for an illustration of the recorder indicators and buttons.

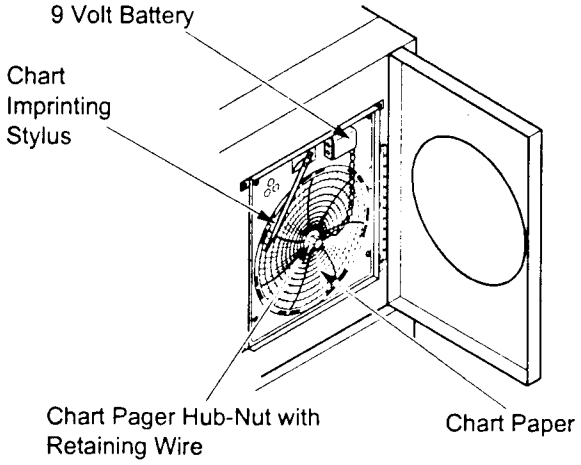


Figure 11. Recorder

4.3.1 9 Volt Battery

The 9 volt battery provides a temporary power supply if the standard power supply fails.

4.3.2 Chart Imprinting Stylus

The chart imprinting stylus is pressure-sensitive. No pen is used.

4.3.3 Chart Pager Hub-Nut with Retaining Wire

The chart pager hub-nut must be in place for recorder operation.

4.3.4 Chart Paper

The chart paper is pressure sensitive. Refer to Section 6.2.2 on page 28 for information about changing the chart paper.

5 Operation

5.1 Temperature Setting

The factory default temperature setting for the Blood Bank Refrigerator is +40°C. When adjusting the temperature, remember that the evaporator setpoint may not be the same as the desired cabinet temperature. For example, an evaporator setpoint of 2°C may be required to keep the cabinet at 4°C.

To change the setpoint temperature on the Blood Bank Refrigerator, complete the following steps:

1. Open the Recorder door (refer to Figure 11 on page 20).
2. Press the SET button to display **SP1**.
3. Press SET again to display the current setpoint value.
4. Use the up ^ arrow or down v arrow to raise or lower the setpoint value.

Note: *Raise or lower the setpoint value* **only 1°C** *then allow the unit to stabilize a minimum of one to two hours at the new setpoint.*

5. Press SET. The display will clear for two seconds, confirming that the new data is in memory.

Note: *If further adjustment is necessary, repeat this procedure.*

If the unit starts to warm up, refer to Table 4 on page 31 for troubleshooting information.

5.2 Start Up

To start up the refrigerator, complete the following steps:

1. Plug in the power cord.
2. Insert the key in the switch and turn the power on. When the power switch is turned on, the LED temperature display shows:

   The temperature display has a range of 0 to 19°C. As the temperature in the cabinet drops below 19°C, the display shows the actual cabinet temperature.
3. Allow approximately 24 hours for the unit to reach operating temperature before loading any product into the unit. After the unit has cooled to the desired operating temperature, turn the three-position key switch one turn clockwise to the ALARM ON position.
4. Set the alarm, refer to Section 3.8 on page 11. Alarm setpoints are factory pre-set for 5.5 and 1.5°C.

All controls are now fully operational, the alarm is activated, the battery and charger are connected, and all visual indicators are active.

5.3 Usage and Performance

For best results, do not load the refrigerator completely with warm products. The typical recovery time for a full load starting at room temperature is approximately 30 hours.

5.4 Automatic Defrost

The defrosting process is primarily accomplished by air circulated during off-cycle periods.

The defrosting process is started every hour by an electronic controller. Defrost duration is set for 15 minutes. However, if the evaporator coil temperature reaches 4°C before the 15 minutes have expired, then the controller overrides the defrost duration and returns to cooling mode.

Under normal conditions, the temperature warm-up during defrost is virtually unnoticeable. However, an occasional 2°C warm-up is possible if the usage and ambient conditions are severe.

5.5 Remote Alarm

5.5.1 Operating the Alarm

The alarm system is designed to provide visual and audio warning signals for both power failure and rise in temperature. The alarm is equipped with a battery backup.

The Alarm System signals are:

- Green Light: normal operation.
- Red Light: power failure or temperature rise.
- Audio Warning: power failure or temperature rise. This signal can be turned off at any time by pressing the Audio Silence button.

The Audio Silence button allows you to turn off the audio warning without turning off the red warning light.

5.6 Recorder

Recorder operation begins when the system is powered on. Refer to Section 6.2.2 on page 28 for information about changing the chart paper.

This Page Intentionally Left Blank.

6 Maintenance

WARNING! Disconnect unit from main power before attempting any maintenance to equipment or controls.

CAUTION! Maintenance should only be performed by trained personnel.

Table 3. Maintenance Schedule

Weekly:	Empty the water accumulated in the Condensate Sump, refer to Figure 2 on page 7. To empty the water, place a container under the sump, remove the plug on the bottom of the sump, and allow the water to drain. Replace the plug when the sump is empty.
Every Six Months:	Clean the Condenser, refer to Section 6.1.2.

6.1 Cleaning

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

6.1.1 Drawers

Use a soft cloth and a solution of water and mild detergent to clean the drawers. Rinse the drawers and wipe them dry with a soft cloth.

6.1.2 Condenser

The condenser and the top of the control box should be cleaned every six months. These components are located in the top refrigerator compartment, refer to Figure 12 on page 26.

CAUTION! Condensers should be cleaned at least every six months. In heavy traffic areas, condensers load with dirt more quickly. Failure to keep the condenser clean can result in equipment warm-up or erratic temperatures.

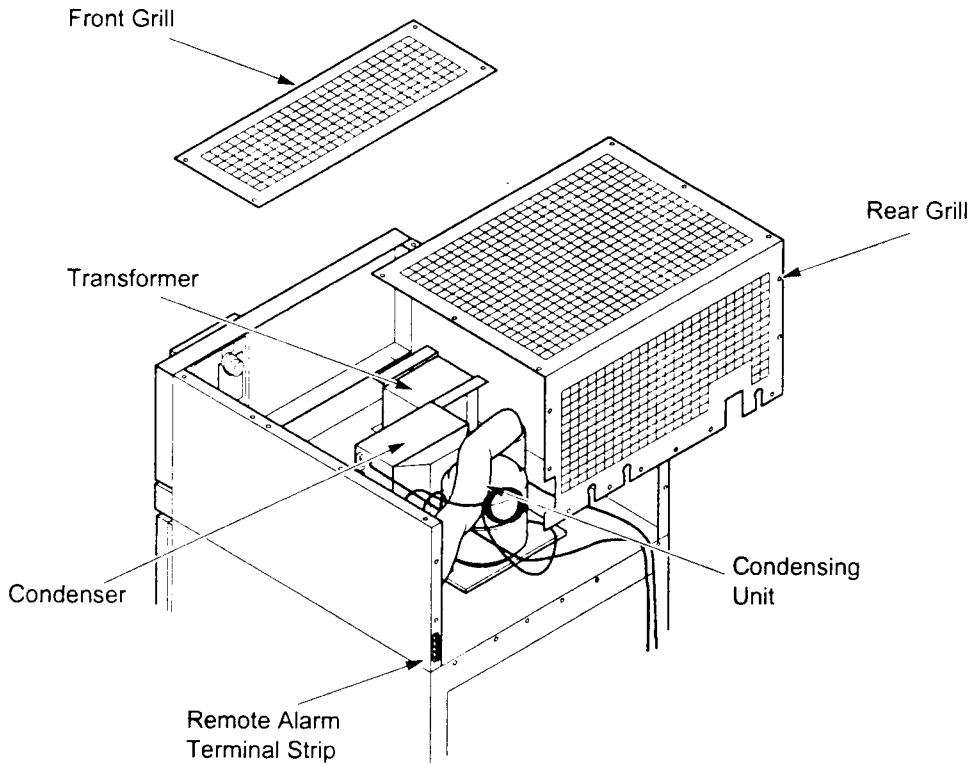


Figure 12. Top Grill Removal

To clean the condenser, complete the following steps:

1. Unplug the refrigerator power cord.
2. Remove the top grills.
3. Use a vacuum cleaner with hose and brush attachments to clean the front face of the finned surface.
4. Replace the top grills.
5. Plug the refrigerator power cord into the power supply.

6.2 Recorder

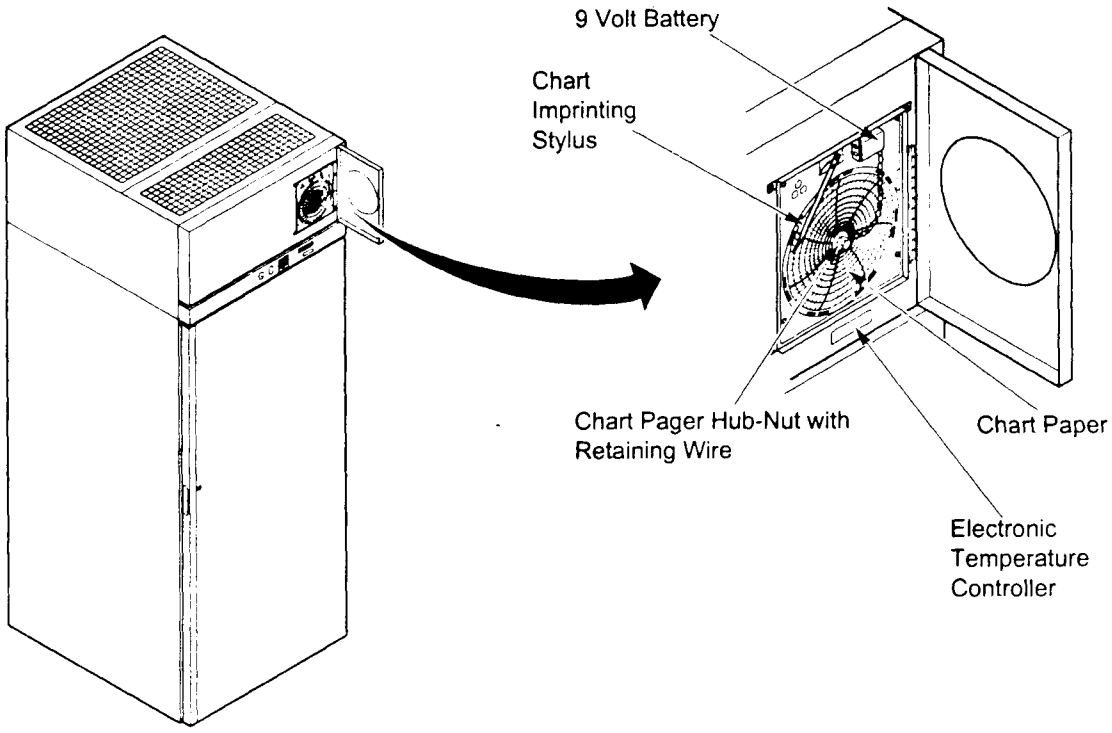


Figure 13. Recorder

6.2.1 Power Supply

The recorder normally uses AC power when the system is operating. If AC power fails, the LED indicator flashes to alert you to a power failure. The recorder continues sensing cabinet temperature and the chart continues turning for approximately 24 hours with back-up power provided by the 9 VDC battery. The LED indicator glows continuously when main power is functioning and the battery is charged.

6.2.2 *Changing the Chart Paper*

To change the chart paper, complete the following steps:

1. Locate the pressure-sensitive buttons at the front, upper left of the recorder panel.
2. Press and hold the change chart button for one second. The pen will move off the scale.
3. Unscrew the center nut, remove the old chart paper, and install new chart paper. Carefully align the day and time with the reference mark on the recorder panel.
4. Replace the center nut and hand-tighten. Press the change chart button again to resume temperature recording.

6.2.3 *Calibration Adjustment*

The recorder is accurately calibrated at the factory and retains calibration even during power interruptions. To calibrate the recorder, complete the following steps:

1. Run the unit continuously at bottom-out temperature. Continue steady operation for at least 30 minutes to provide adequate time for recorder response.
2. Measure the cabinet center air temperature with a calibrated temperature monitor.
3. Compare the recorder temperature to the center air temperature. If necessary, adjust the recorder by pressing the left and right chart buttons.

Note: *The stylus does not begin to move until the button is held for five seconds.*

6.3 Door Gasket

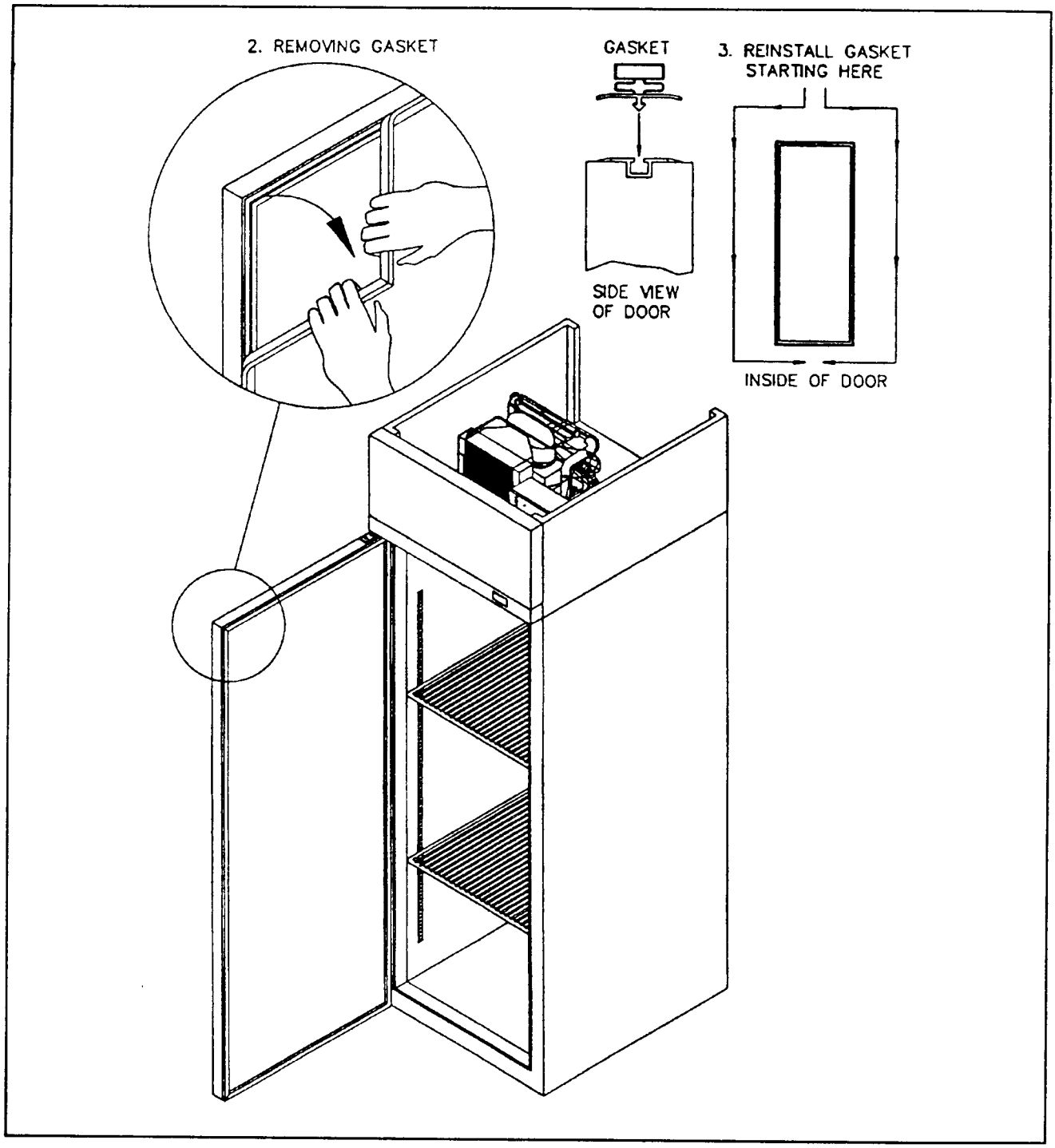


Figure 14. Door Gasket

6.3.1 *Removing the Door Gasket*

To remove the door gasket, start at the corner of the gasket and pull the gasket toward you as shown in Figure 14 on page 29.

6.3.2 *Installing the Door Gasket*

To install the door gasket, start at the top corner of the door and work clockwise, inserting the dart, located at the rear of the gasket, into the retainer on the refrigerator door (refer to Figure 14 on page 29).

6.4 Sensor Bottles

Two sensor bottles contain a mix of glycerine and water to simulate blood samples. These bottles are factory-installed and are located at the top and bottom of the cabinet.

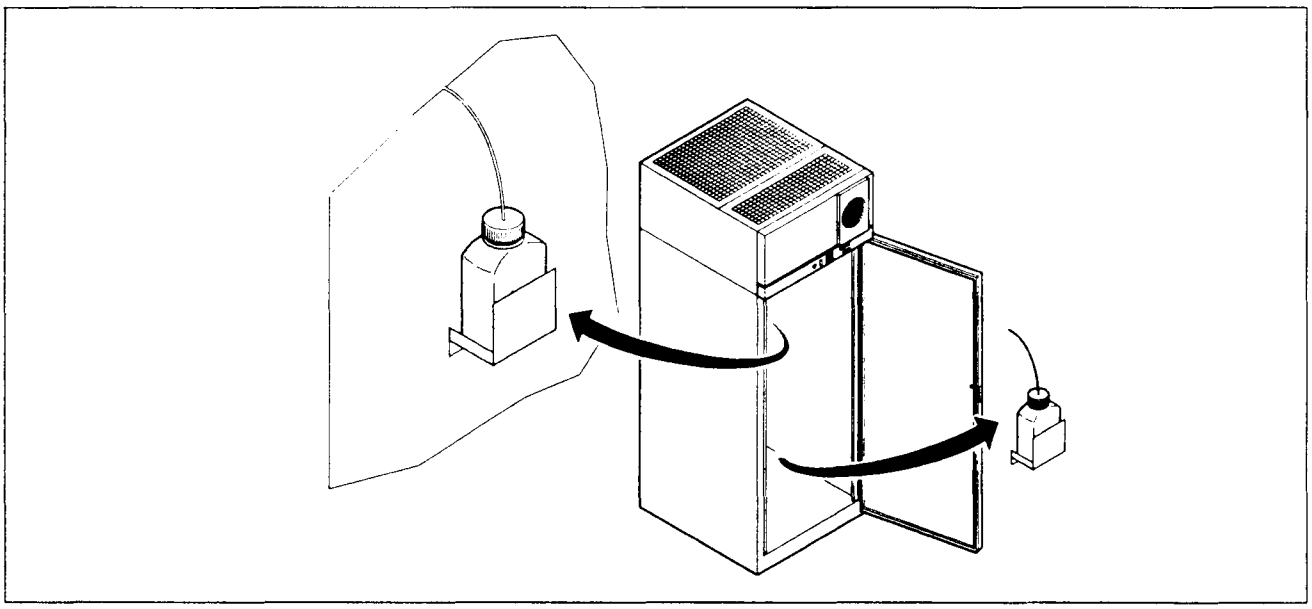


Figure 15. Sensor Bottles

7 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

This section is a guide to troubleshooting equipment problems.

Table 4. Troubleshooting Procedures

Problem	Cause	Solution
Unit does not operate or Power Failure Indicator is on.	Power supply	1. Check that the cord is securely plugged in. 2. Plug another appliance into the outlet to see if it is live. 3. If the outlet is dead, check the circuit breaker or fuses.
Temperature fluctuates.	Cold control	Make sure that the cold control is set correctly. Refer to Section 5.1 on page 21.
	Condenser	Make sure the condenser is clean. Refer to Section 6.1 on page 25.
	High pressure	Check the system high-pressure cut-out button. This is an encapsulated control with a rubber boot over the reset button. To reset the control, push it down; use a blunt instrument to avoid tearing the boot.
Unit warms up.	Door is open.	Make sure the door is completely closed.
	Warm product recently loaded in unit.	Allow ample time to recover from loading the warm product.
	Power supply	Check for proper voltage to the unit. If there is no voltage to the unit, call an electrician.
	Compressor	1. If the compressor is not running, check the power failure alarm. If the power failure alarm light is on, have an electrician check for proper voltage to the unit. 2. If the compressor is running, open the door and look through the slotted air intake in the bottom of the evaporator cover to see if icing is present on the evaporator. If icing is present, check for the following: a. No air flow behind evaporator. Call technical service for assistance. The evaporator fans may be inoperative. b. Door is left ajar, heavy loading, or excessive door openings. Close the door and allow the unit to stabilize. 3. If the compressor is running and there is airflow behind the evaporator, contact an authorized service provider or call technical service for assistance.

This Page Intentionally Left Blank.

8 Accessories

Table 5. Accessories

Description	Catalog No.
Alarm Systems	
Standard Remote Alarm. Provides an audible and visual signal in the event of temperature rise or power failure. Adaptable to telephone switchboard. Can be located up to 1/3 mile (1760 ft/536 m) from cabinet. Must be used with electronic alarm system and connected to Normally Open or Normally Closed remote alarm contacts. Wire not included. Specify voltage when ordering.	5612
Deluxe Electronic Remote Alarm System. User programmable to sound alarm in the event of temperature rise or power failure. Can dial up to four telephone numbers to advise of alarm condition across any telephone system which accepts pulse dialing. One System can monitor up to four individual cabinets. In addition, the System can monitor up to three groups of cabinets. Contact Harris/P-H for detailed specifications. Customer installed.	6224
Temperature Recorders	
Temperature recorder, 6 in. circular chart, seven-day drive, panel mounted. Factory installed. Specify when ordering.	6183-7
Temperature recorder, 6 in. circular chart, seven-day drive, free-standing, for all refrigerator models, -20°C and -30°C freezers. Customer installed. Specify voltage when ordering.	6383-7
Chart Paper	
Chart paper, package of 50, for 6 in., seven-day recorder, -40°C to +25°C.	6184
Low Voltage Protection	
Voltage Safeguard. Free-standing. Helps protect electrical equipment from damage by boosting low voltage automatically. Provided with terminal board for direct wiring. Field installed. Specify voltage when ordering.	5575
Casters	
Dual-Wheel Casters. Set of four, 2 in. diameter.	6041
Drawers	
For LR-3004, roll-out drawer assembly, six additional stainless steel drawers, fully adjustable, fully extendable.	6704
Extended Warranty Options	
Note: In addition to Harris/P-H standard 12-Month full warranty on the complete product (USA and Canada), Harris/P-H can supply an additional four year protection on compressor and compressor parts. This additional coverage must be purchased at the time of original product purchase. Under this contract, Harris/P-H agrees to furnish a compressor FOB our factory to replace one which has been determined to be defective by Harris/P-H or a factory authorized Harris/P-H Service Agency.	

This Page Intentionally Left Blank.

9 Warranty

9.1 Domestic Warranty 12 Months Full Warranty, Parts and Labor United States of America and Canada

Harris Manufacturing, P-H Division warrants this product to the owner for a period of twelve (12) months from date of shipment by Harris/P-H. Under this warranty, Harris/P-H, through its authorized service organizations, will repair, or at its option, replace any part found to contain a manufacturing defect in material or workmanship without charge to the owner for parts, service labor, or any shipping or cartage costs. Replacement or repaired parts will be warranted for only the unexpired portion of the original warranty. This warranty is limited to products purchased and installed in the United States of America and Canada. It does not apply to damage caused by accident, misuse, fire, flood, or acts of God. It does not apply to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

To obtain prompt warranty service, simply contact the nearest authorized service center or dealer listed in the directory enclosed with each product. Harris/P-H's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Harris/P-H's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

9.2 International Warranty 16 Months Parts Warranty

Harris Manufacturing, P-H Division warrants this product to the owner for a period of sixteen (16) months from the date of shipment by Harris/P-H. If any part is found to contain a manufacturing defect in material or workmanship, Harris/P-H assumes no responsibility for any labor expenses for service, removal, or reinstallation required to replace part, or for incidental repairs, and such costs are the responsibility of the Owner unless a service labor agreement exists between the Owner and his Dealer.

The warranty does not apply to damage caused by accident, misuse, fire, flood, or acts of God, or to defects resulting from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

10 Diagrams

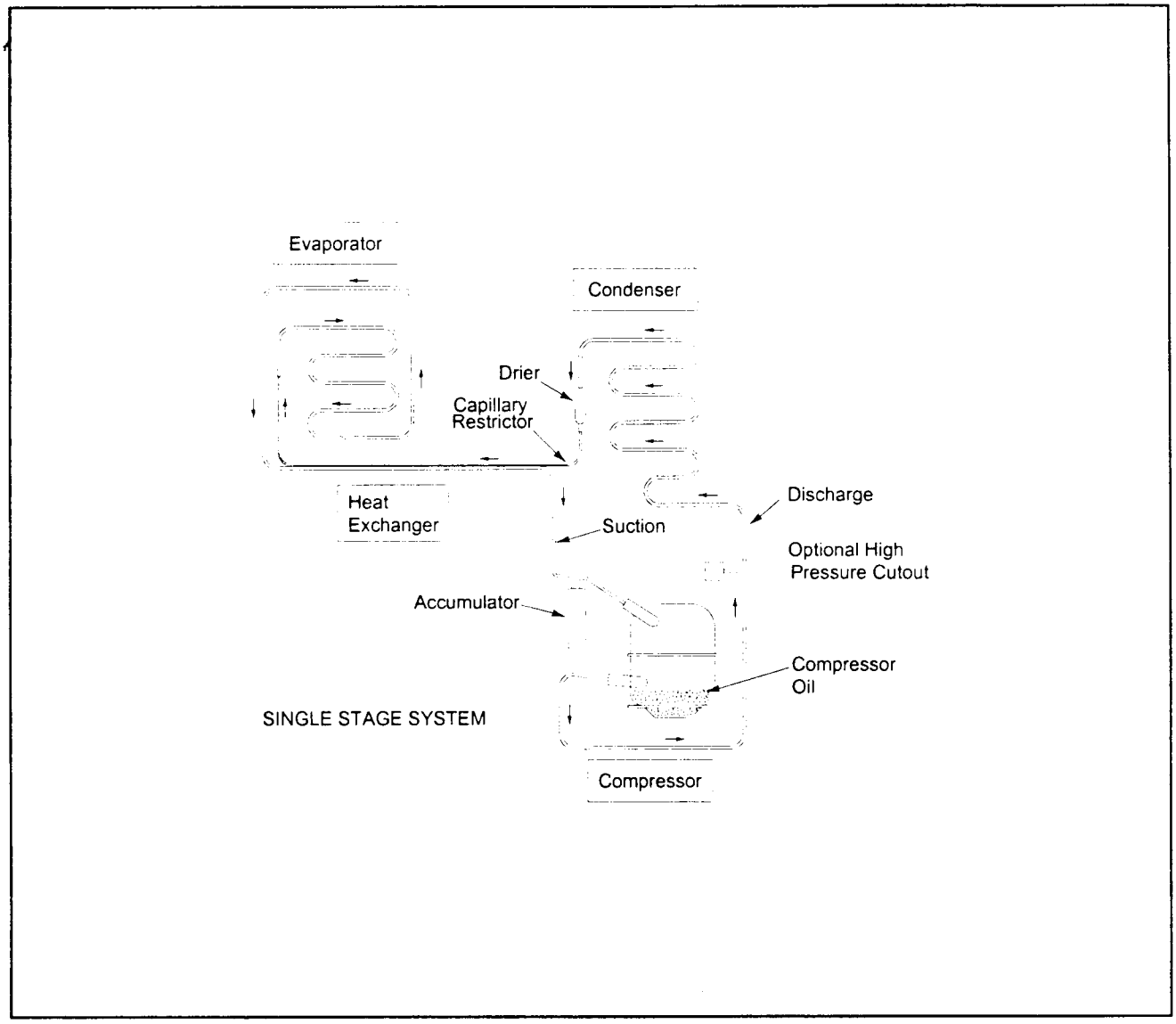


Figure 16. Piping Diagram

To obtain prompt warranty service, simply contact the Dealer from whom you purchased the product or the nearest Dealer handling Harris/P-H Products. Harris/P-H's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Harris/P-H's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

9.3 Extended Warranty Options

Optional warranty extensions are available by special order. Contact your Dealer for more information on 12-month compressor parts warranties and 12-month compressive parts and labor warranty extensions.

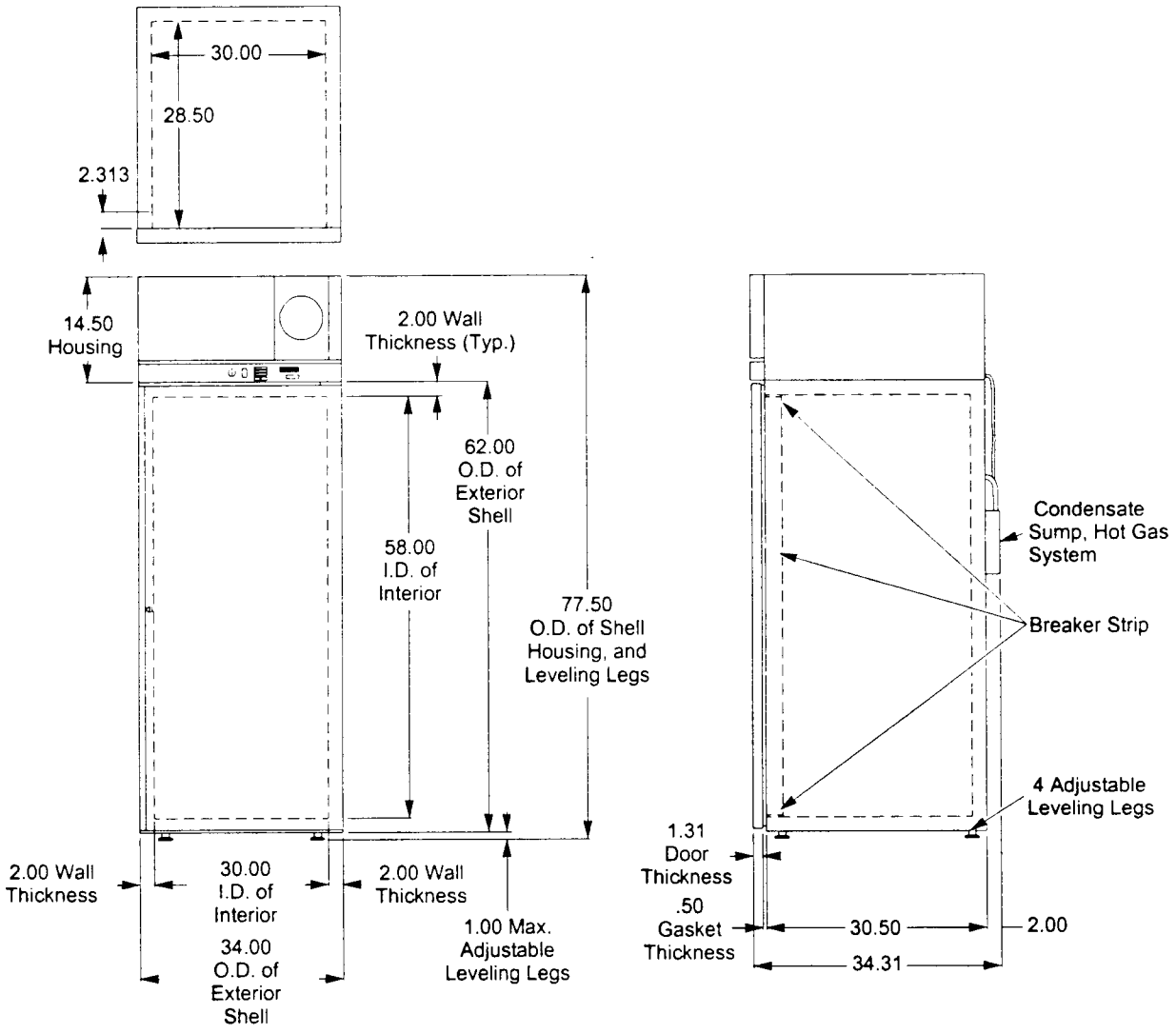


Figure 17. Dimension Diagram

Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

Date Purchased: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (Harris/P-H or specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

Harris/P-H SALES DIVISION

Phone:	704/658-2711 800/221-4201
FAX:	704/658-0363

LABORATORY PARTS and SERVICE

Phone:	800/438-4851
FAX:	704/658-2576

TECHNICAL SUPPORT

Phone:	800/438-4851

Harris Mfg.
P-H Div.
275 Aiken Road
Asheville, NC 28804
U.S.A.

Harris Mfg.
P-H Div.

Blood Bank Refrigerator

Service Manual

[redacted]

34830H11

© June, 1996 Harris/P-H
All rights reserved
Printed in U.S.A.

Table of Contents

1 Introduction **1**

1.1 General Description 1

1.2 Specifications 2

1.3 Safety Considerations 3

2 Installation **5**

2.1 Unloading 5

2.2 Inspection 5

2.3 Storage 5

2.4 Unpacking 5

2.5 Location 6

2.6 Wiring 6

2.6.1 110 VAC Installation 7

2.6.2 230 VAC Installation 8

2.7 Leveling 9

2.8 Remote Alarm 9

2.8.1 Remote Alarm Terminals 9

2.8.2 Installation 10

2.9 Alarm Test 11

2.9.1 Theory of Operation 11

2.9.2 Alarm Test Procedure 11

2.10 Recorder 12

2.10.1 Set-Up and Operation 12

2.11 Drawers 12

2.11.1 Removing the Drawers 13

2.11.2 Reinstalling the Drawers 13

2.11.3 Changing Drawer Slide Position 14

2.12 Door Seal 14

2.13 Final Checks 14

3 Operation **15**

3.1 Recorder Functions 15

3.1.1 9 Volt Battery 15

3.1.2 Chart Imprinting Stylus 15

3.1.3 Chart Pager Hub-Nut with Retaining Wire 15

3.1.4 Chart Paper 15

3.2 Monitoring Panel Functions 16

3.2.1 Key-Operated Power and Alarm Switch 16

3.2.2 Interior Light Switch 16

3.2.3 Warning Indicator Lights 16

3.2.4 Temperature Display Window 17

3.2.5 Audio Alarm Silence Button 17

3.2.6 Alarm Test Button 17

3.2.7 Sensor Selector Button 17

3.3 Control Panel Functions 18

3.3.1 Adjustment Arrows 18

3.3.2 Temperature Display Unit 18

3.3.3 SET Button 18

3.3.4 Evaporator Air Temperature 18

3.4 Temperature Setting 19

3.5 Start Up 19

3.6 Usage and Performance 20

3.7 Automatic Defrost 20

3.8 Remote Alarm 20

3.8.1 Operating the Alarm 20

3.9 Recorder 20

4 Theory of Operation **21**

4.1 Refrigeration System Operation 21

4.1.1 Compressor 21

4.1.2 Condenser 21

4.1.3 Drier-Strainer 21

4.1.4 Capillary Tube 21

4.1.5 Evaporator 21

4.1.6 Suction Line 22

5 Maintenance **23**

5.1 General Information 23

5.2 Refrigeration System Maintenance 25

5.3 Cleaning 26

5.3.1 Condenser 26

5.3.2 Drawers 27

5.4 Replacement Procedures 28

5.4.1 Recorder 28

5.4.2 Door Gasket 31

5.4.3 Sensor Bottles 32

5.4.4 Fluorescent Light 34

5.4.5 Rocker Switch (64151H01) 35

5.4.6 Rocker Switch (46731H02) 36

5.4.7 Fan Motor 38

5.4.8 Ballast Replacement 39

5.4.9 Gel Cell Battery Replacement 40

5.5 Replacement Parts 41

6 Troubleshooting **43**

7 Accessories **45**

8 Warranty **47**

8.1 Domestic Warranty 12 Months Full Warranty, Parts and Labor United States of America and Canada 47

8.2 International Warranty 16 Months Parts Warranty 47

8.3 Extended Warranty Options 48

9 Diagrams **49**

List of Figures

Figure: 1. Blood Bank Refrigerator . . . 1
Figure: 2. Blood Bank Refrigerator Rear View (shows 230 Volt service in use) . . . 7
Figure: 3. Rear Grill Removal for 230 VAC Installation . . . 8
Figure: 4. Remote Alarm Connections . . . 9
Figure: 5. Drawer Removal . . . 12
Figure: 6. Recorder . . . 15
Figure: 7. Monitoring Panel . . . 16
Figure: 8. Control Panel . . . 18
Figure: 9. Single Stage System . . . 22
Figure: 10. Top Grill Removal . . . 26
Figure: 11. Recorder . . . 28
Figure: 12. Door Gasket . . . 31
Figure: 13. Sensor Bottles . . . 32
Figure: 14. Fluorescent Light Tube Location . . . 34
Figure: 15. Rocker Switch (64151H01) . . . 35
Figure: 16. Replacing Parts at Interior Top of Cabinet . . . 37
Figure: 17. Piping Diagram . . . 49
Figure: 18. Wiring Diagram . . . 50
Figure: 19. Dimension Diagram . . . 51
Figure: 20. Control Wiring Diagram . . . 52

List of Tables

Table 1. Blood Bank Refrigerator Specifications . . . 2
Table 2. Wire Gauges . . . 10
Table 3. Maintenance Schedule . . . 23
Table 4. Test Equipment . . . 23
Table 5. Tools . . . 24
Table 6. Replacement Parts . . . 41
Table 7. Troubleshooting Procedures . . . 43
Table 8. Accessories . . . 45

1 Introduction

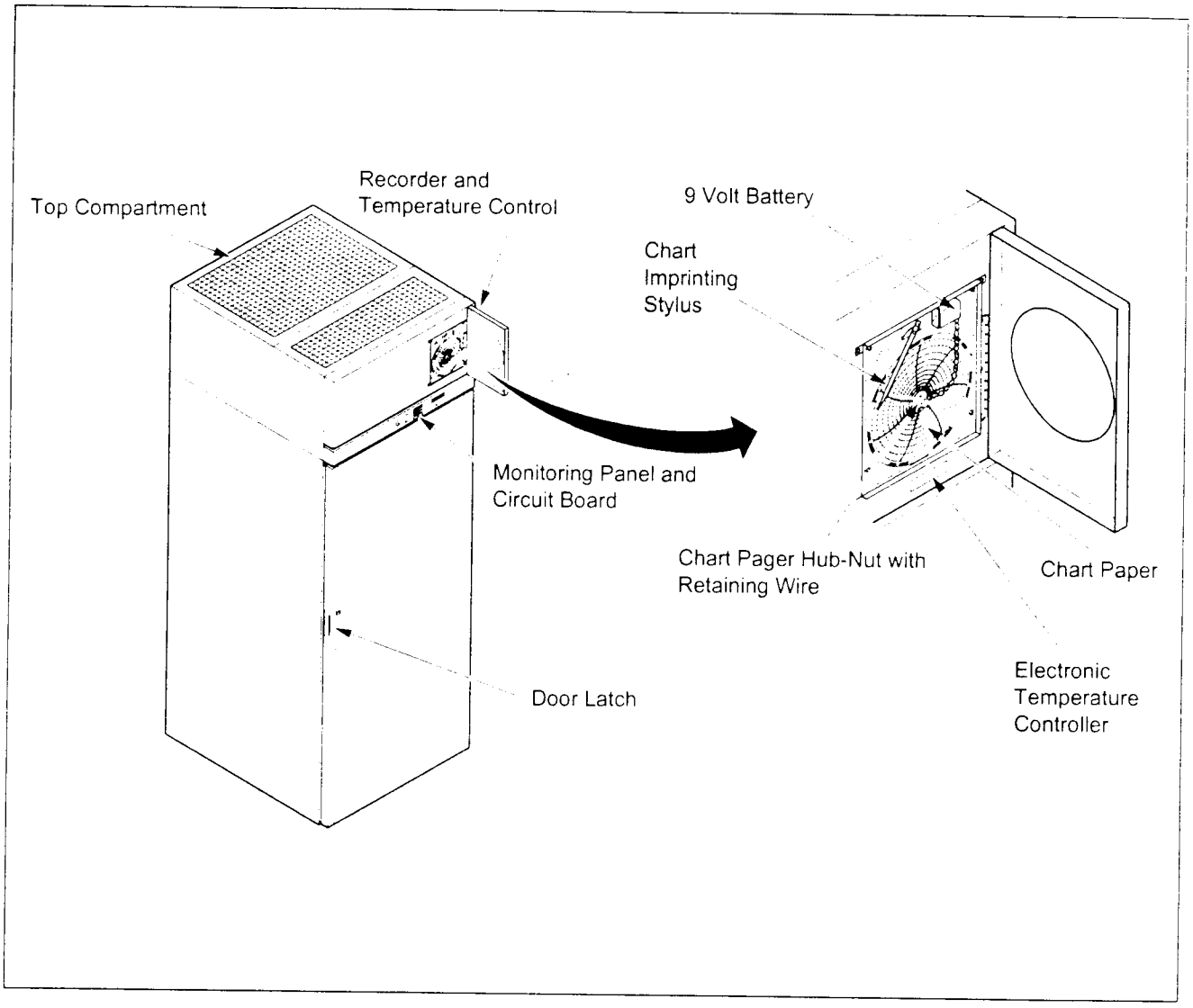


Figure 1. Blood Bank Refrigerator

1.1 General Description

The Blood Bank Refrigerator is designed to meet strict requirements established by the AABB, ANRC, and FDA. The refrigerator includes reliable, field-proven refrigeration systems and simplified push-button alarm text functions to provide maximum protection for the stored product and is built to UL and CSA Standards for safety and performance.

1.2 Specifications

Table 1. Blood Bank Refrigerator Specifications

Product		Blood Bank Refrigerator
Dimensions W x H x D in. (cm)	Interior	30 x 58 x 28.5 (76.2 x 147.3 x 72.4)
	Exterior	34 x 79.5 x 36.2 (86.4 x 202 x 91.9)
Shipping	Base	39 in. (F-B) x 41 in. (across front) (99.1 x 104.1 cm)
	Height (approximate)	83 in. (210.8 cm)
	Weight (approximate)	665 lb (302 kg)
Power	Requirements	110 and 230 V; 50 and 60 Hz
	Consumption	18 kilowatts per day under normal operating conditions
Environmental	Operating Temperature	2 to 4°C at 15 to 35°C ambient temperature
	Shipping and Storage Temperature	50 to 100°F 10 to 50% relative humidity
Capacity	Maximum Load	qty. 539 450ml blood bags
	Minimum Load	N/A
Material	Body	Stainless Steel
	Drawers and Shelves	Stainless Steel

1.3 Safety Considerations

WARNING! Do not modify or use equipment in a manner other than expressly intended. Modification of equipment other than that for which it is explicitly designed could cause severe injury or death. Any customer after-market retrofit violates the warranty of the equipment.

Do not reconfigure the controller. Any reconfiguration of the control instrument could cause inaccurate readings, faulty instrument values, and may cause the unit to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not modify or disconnect any safety features provided. Disconnection of the unit safety features could allow the unit to become overheated and start on fire, causing personal injury or death, product and property damage.

Do not use components or materials not specifically designed for this equipment. Failure to comply with this precaution could result in damage to equipment used or the furnace and may create an overheat situation. Also, do not use anything other than OEM exact replacement equipment and parts. Not using OEM replacement parts could cause faulty instrumentation readings, inoperable equipment, or temperature overshoot. Both situations may cause personal injury or death, product, and property damage.

Before using, user shall determine the suitability and integrity of the product for the intended use and that the unit has not been altered in any way. Misapplication may compromise the safety of the end user or the life of the product.

CAUTION! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

WARNING! Disconnect unit from main power before attempting any maintenance to equipment or controls.

CAUTION! Improper operation of the equipment could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within design limits noted on the dataplate.

2 Installation

2.1 Unloading

Always be sure that the cabinet is kept in the upright position. Do not drop it or lay it on its side.

When moving the crated cabinet, lift it with a fork lift in the areas marked "Fork Here" on the corrugated container.

Do not use clamps or hand trucks to move the container from the carrier.

2.2 Inspection

Upon delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.

If there is no exterior damage, unpack and inspect the equipment within five days of delivery, following the unpacking instructions in Section 2.4 below. If you find any damage, keep the packing materials and immediately report the damage to the carrier. **Do not return goods to Harris/P-H without a written authorization.** When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

2.3 Storage

If you are storing the unit prior to unpacking and installation, be sure that the ambient temperature range at the storage location is 50° to 100°F with relative humidity between 10% and 50%. Do not store items on top of the corrugated container.

2.4 Unpacking

To unpack the unit:

1. A team of three people is recommended for unpacking. The cabinet is heavy.
2. Remove the corrugated top.
3. Carefully cut the carton on the back at the dotted line. Cutting deeper than 1/2" into the corrugated container could result in damage to the cabinet.
4. Remove the carton from the unit.
5. Remove internal packing material and shelving from the inside of the cabinet.
6. Remove the wooden base by extracting the bolts from the cabinet base. Carefully slide the cabinet off the base.

2.5 Location

Install the unit in a level area free from vibration with a minimum of three inches of space on the sides and rear and 12 inches at the top.

Do not position the equipment in direct sunlight or near heating diffusers, radiators, or other sources of heat. The ambient temperature range at the location must be 59 to 95°F (15 to 35°C).

2.6 Wiring

Do not exceed the electrical and temperature ratings.

Refer to Figure 18 on page 50 for the wiring diagram.

CAUTION! Connect the equipment to the correct power source. Incorrect voltage can result in severe damage to the equipment.

CAUTION! For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.

Always connect the equipment to a dedicated (separate) circuit. Electrical codes require fuse or circuit breaker protection for branch circuit conductors. Use time delay fuses for #12 AWG circuits.

The unit has an internal fuse block used for installations with 230 VAC service. ***This fuse block is in addition to, and does not replace, the external time delay fuses or circuit breakers that are required for all installations.***

Refer to Section 2.6.1 on page 7 for 110 VAC installation instructions and Section 2.6.2 on page 8 for 230 VAC installation instructions.

2.6.1 110 VAC Installation

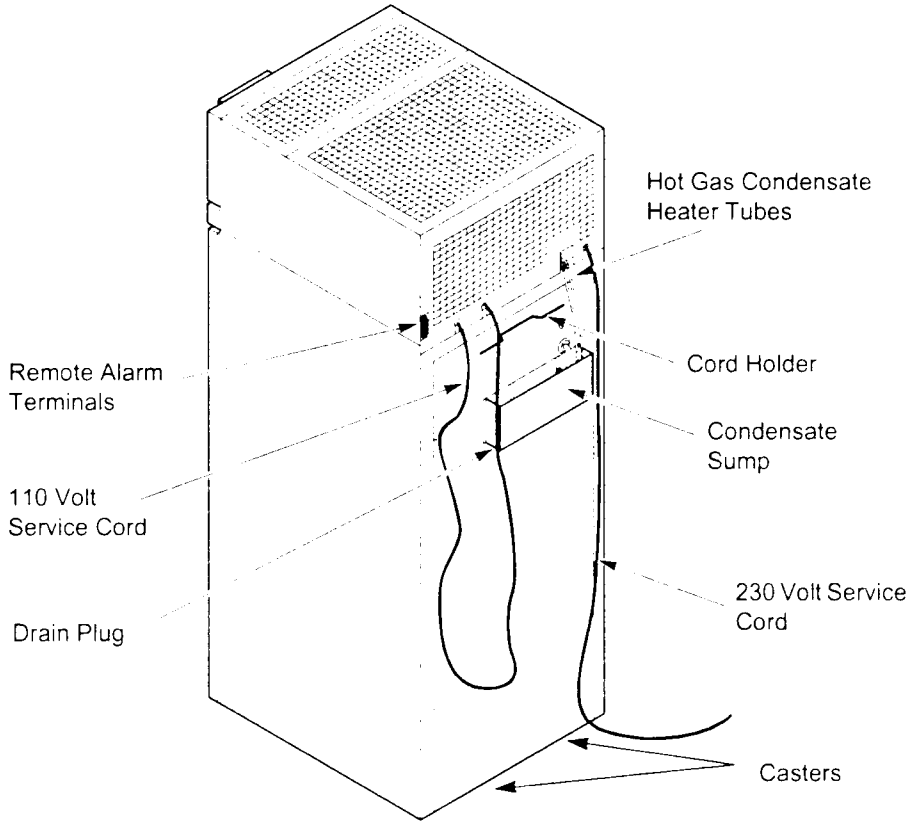


Figure 2. Blood Bank Refrigerator Rear View
(shows 230 Volt service in use)

1. Unwrap the 110 VAC power cord from the cord holder.
2. Plug the 110 VAC power cord into the power supply.

2.6.2 230 VAC Installation

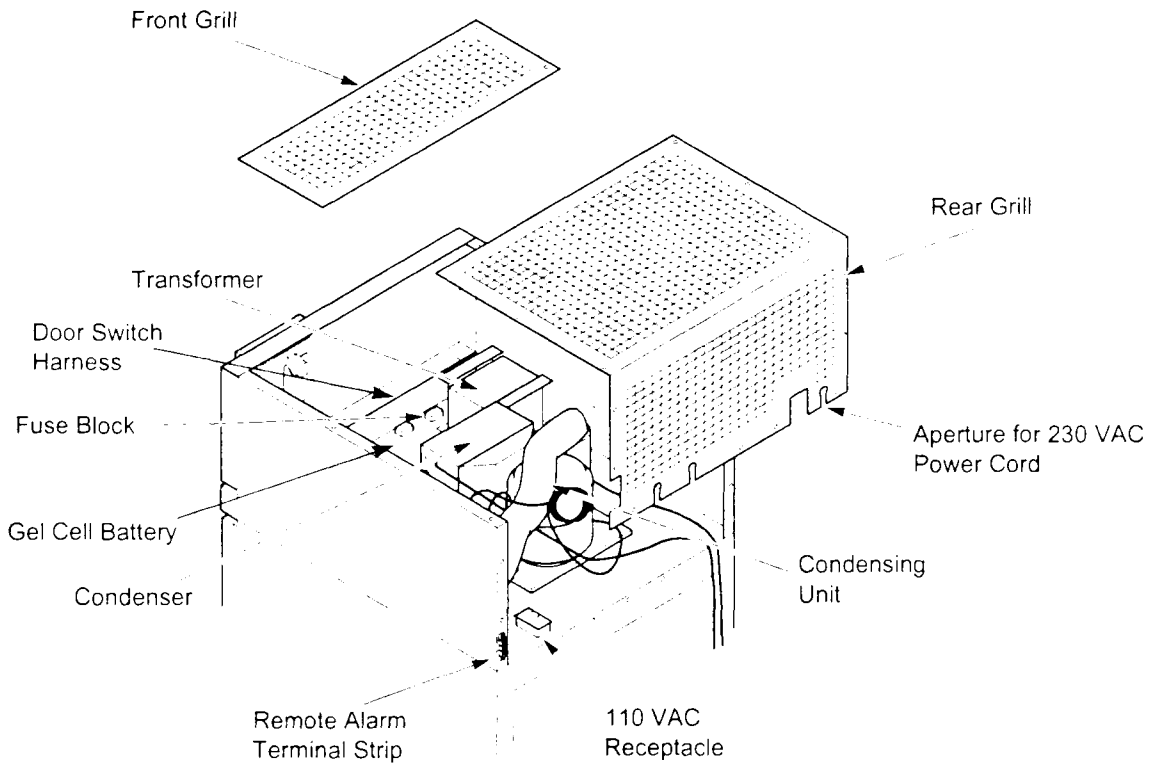


Figure 3. Rear Grill Removal for 230 VAC Installation

1. Remove the rear grill screws at the back and side and open the rear grill (refer to Figure 3).
2. Unwrap the 110 VAC power cord from the cord holder and plug it into the 110 VAC receptacle inside the top grill.
3. Uncoil the 230 VAC power cord and run it through the aperture on the right side of the rear grill.
4. Replace the rear grill.
5. Plug the 230 VAC power cord into the power supply.

2.7 Leveling

The unit must be level. Rotate the leveling screws, located under the front corners of the unit, until the unit is level. If the floor is seriously out of level, you may need to shim the corners with thin sheets of metal.

Note: *Use thin sheets of metal to level units equipped with optional casters.*

2.8 Remote Alarm

2.8.1 Remote Alarm Terminals

Remote alarm terminals are located at the rear of the machine compartment (refer to Figure 4). The terminals are: Common, Normally Closed, and Normally Open.

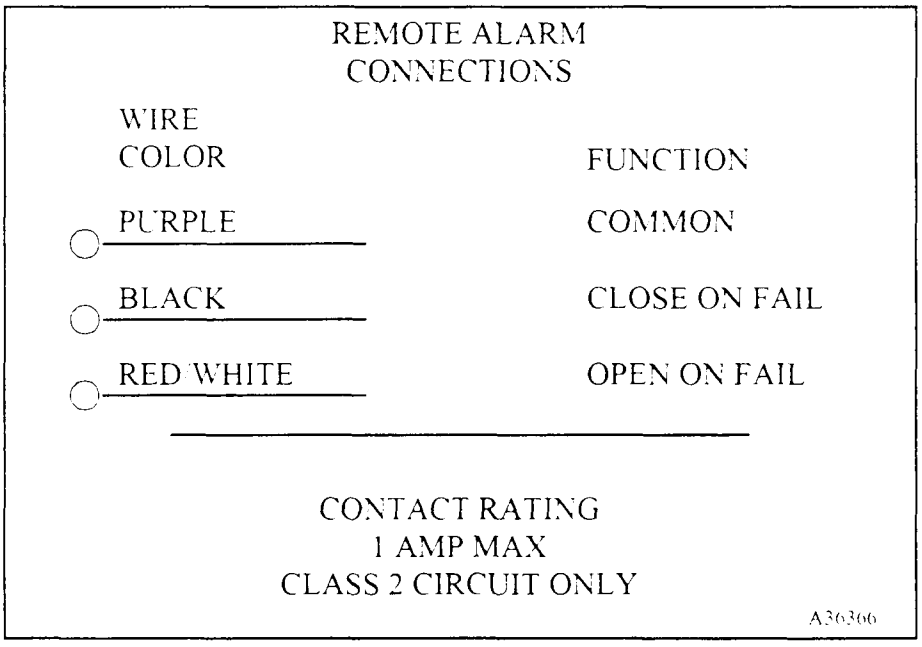


Figure 4. Remote Alarm Connections

2.8.2 Installation

Note: *The remote alarm system has two keyhole slots on the back to hang the alarm system on the wall.*

To install the remote alarm, complete the following steps:

1. Insert two screws, no longer than a #12 truss-head type and spaced two inches apart, into a wall.
2. Mount the alarm.
3. Refer to Table 2 to make the following connections:
   a. Connect the Common terminal on the cabinet switch to the orange wire on the alarm.
   b. Connect the Normally Closed terminal on the cabinet to the red wire on the alarm. This connection sounds an alarm when the switch contacts open.

Note: *If you require the alarm signal when the switch contacts close, connect the Normally Open terminal on the cabinet to the black wire on the alarm. In this application, the orange and red wires must be tied together.*

Table 2. Wire Gauges

Wire Gauge	Total Wire Length (feet)	Distance to Alarm 1/2 Wire Length (feet)
20	530	265
18	840	420
16	1,330	665
14	2,120	1,060
12	3,370	1,685

4. Plug the alarm system service cord into an electrical outlet. This alarm is designed for 115V/60 Hz, 115V/50 Hz, 100V/50 Hz operation.

Note: *The wiring diagram is attached to the inside of the alarm back cover.*

2.9 Alarm Test

2.9.1 Theory of Operation

The alarm test checks the artificially heated and cooled temperature sensor. A tiny, built-in thermoelectric heating and cooling unit simulates both warm and cold conditions. The electronic monitoring module notes the sensor temperature changes and the LED displays these changes.

2.9.2 Alarm Test Procedure

Note: *This test automatically advances through all steps and stops.*

When the unit is in operating temperature range, press and release the Alarm Test button (refer to Figure 7 on page 16). The following sequence occurs:

1. The LED indicator to the right of the button lights and the temperature on the display rises to the alarm temperature.
2. The alarm sounds and the LED indicator beside the Temperature Failure box lights.
3. The temperature display begins to drop. After a few seconds, the temperature in the display is back in the operating range.
4. The alarm stops. The temperature on the display drops until the cold alarm sounds.
5. The test is now complete but the alarm continues to sound until the temperature on the display is back in the operating range.

Note: *While this alarm testing procedure is very accurate and reliable, the temperature of the refrigerated space does not change during the alarm test.*

2.10 Recorder

2.10.1 Set-Up and Operation

To set up the factory-installed recorder, complete the following steps:

1. Open the recorder door to access the recorder.
2. Connect the 9 VDC battery located at the recorder's upper right corner. This battery provides back-up power.
3. Install clean chart paper (refer to Section 5.4.1.2 on page 29).
4. Remove the plastic cap from the pen stylus and close the recorder door.

Note: *The recorder may not respond until the system reaches temperatures within the recorder's range. Refer to Section 5.4.1 on page 28 for additional information.*

2.11 Drawers

The drawer slides are adjustable. You can position these slides in the vertical slots which are spaced at one-inch intervals.

CAUTION! Drawer slides do *not* require lubrication. Additional lubricant could impede movement of the drawers when the lubricant is cold.

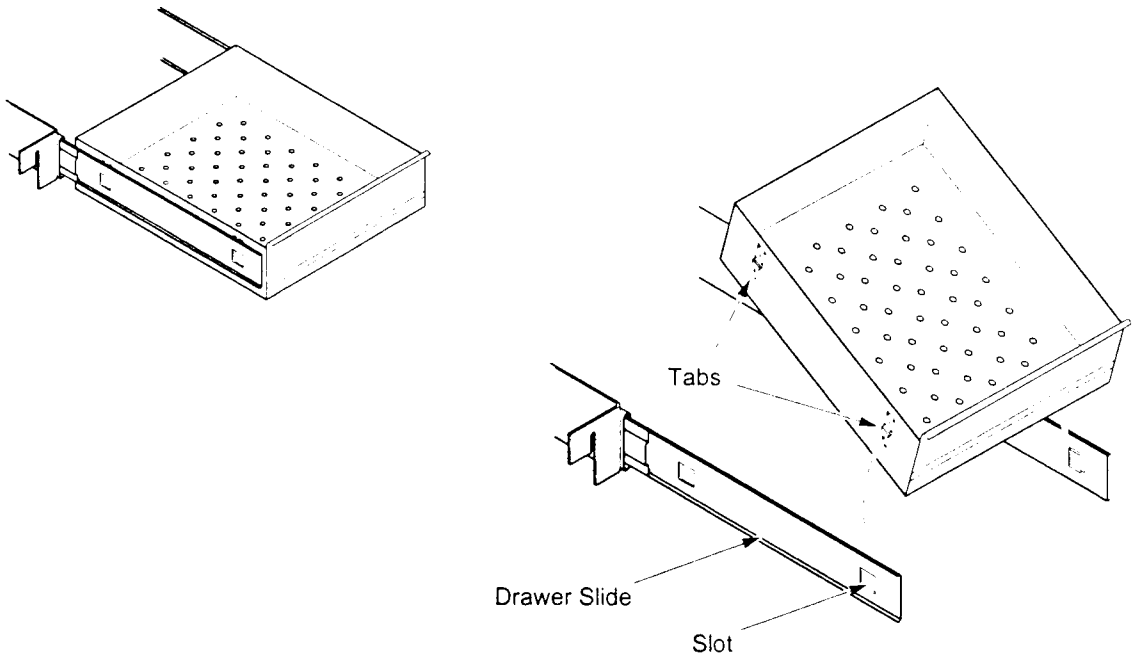


Figure 5. Drawer Removal

2.11.1 Removing the Drawers

To remove the drawers, complete the following steps (refer to Figure 5):

1. Pull the drawer toward you until the slides are fully extended.
2. Lift the back of the drawer to disengage the mounting tabs from the slots on the slides.

Note: *The drawers fit snugly between the slides. Push the back of the drawer from underneath to remove the drawer.*

3. Raise the back of the drawer almost to a vertical position and disengage the front mounting clips from the slides.

2.11.2 Reinstalling the Drawers

To reinstall the drawers, complete the following steps (refer to Figure 5):

1. Pull both drawer slides toward you until the slides are fully extended.
2. Position the drawer between the slides and insert the front mounting clips into the slots on front of the slides.
3. Push the back of the drawer down between the slides and insert the drawer tabs into the back slots.

Note: *The drawers fit snugly between the slides. Push on the back of the drawer from the inside to insert the drawer tabs completely into the slots. Make sure both drawer tabs are aligned with the slots on the slides before pushing the drawer down between the slides.*

2.11.3 Changing Drawer Slide Position

Drawer slides have a small wire safety clip at the front pilaster which prevents the slides from falling when the drawers are removed. To change the position of the drawer slides, complete the following steps:

1. Locate the safety clip.
2. Slip your fingernail or a small screwdriver under the bottom of the wire clip and pry the clip out toward the inside of the refrigerator.
3. Lift up the slide at the front. The slide is free to move from the front pilaster.

   The drawer slide must be removed from the rear pilaster at approximately a 45 degree angle toward the center of the cabinet.
4. Pull the slide toward the front of the cabinet.

2.12 Door Seal

To check the door seal, complete the following steps:

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4-inch intervals around the door. If the door does not seal properly, call service personnel to replace the gasket.

DANGER: Door seal integrity is critical for refrigerators and freezers. A loose fitting gasket allows moist air to be drawn into the cabinet, resulting in quicker frost buildup on the evaporator coil, longer running time, poor temperature maintenance, and increased operation cost.

2.13 Final Checks

Before start up, complete the following steps:

1. Make sure that the unit is free of all wood or cardboard shipping materials, both inside and outside.
2. Verify that the unit is connected to a dedicated circuit.

CAUTION! Connect the equipment to a separate, dedicated, power source. Power fluctuations can result in severe damage to the equipment.

3 Operation

3.1 Recorder Functions

Refer to Figure 6 for an illustration of the recorder indicators and buttons.

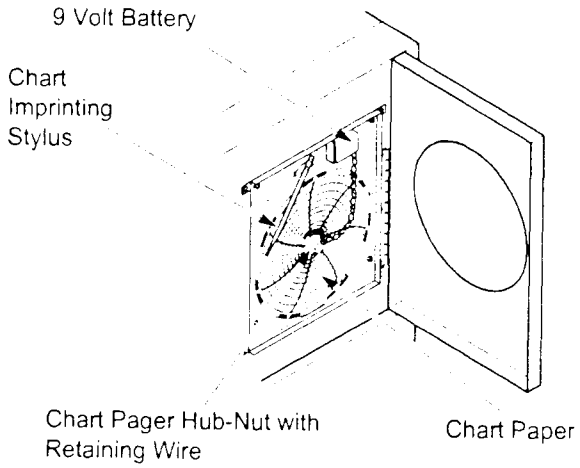


Figure 6. Recorder

3.1.1 9 Volt Battery

The 9 volt battery provides a temporary power supply if the standard power supply fails.

3.1.2 Chart Imprinting Stylus

The chart imprinting stylus is pressure-sensitive. No pen is used.

3.1.3 Chart Pager Hub-Nut with Retaining Wire

The chart pager hub-nut must be in place for recorder operation.

3.1.4 Chart Paper

The chart paper is pressure sensitive. Refer to Section 5.4.1.2 on page 29 for information about changing the chart paper.

3.2 Monitoring Panel Functions

Refer to Figure 7 for an illustration of the monitoring panel indicators and buttons.

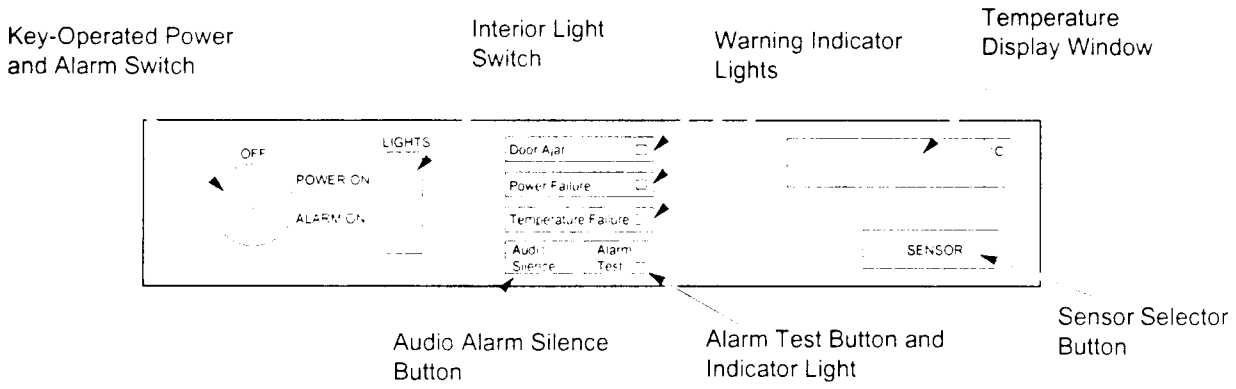


Figure 7. Monitoring Panel

3.2.1 Key-Operated Power and Alarm Switch

This switch applies power to the refrigerator and activates the alarm.

3.2.2 Interior Light Switch

This switch activates the interior light when the refrigerator door is closed.

3.2.3 Warning Indicator Lights

3.2.3.1 Power Fail LED

This light indicates that the AC power has failed and that the monitoring panel functions and the alarm are operating on battery power. To display the cabinet temperature at this time, press and hold the Audio Silence button. When the button is released, the display goes blank to conserve battery power.

CAUTION! If the equipment experiences a power failure, have a certified electrician check the power supply before operating the equipment.

3.2.3.2 Temperature Failure LED

This light indicates that the sensor is reading a cabinet temperature in the alarm zone.

3.2.3.3 Alarm Test LED

This light indicates that the automatic alarm test is in progress.

3.2.4 Temperature Display Window

This window displays the cabinet temperature during normal operation and the temperature in the lower portion of the cabinet when the Sensor Selector Button is depressed (refer to Section 3.2.7).

3.2.5 Audio Alarm Silence Button

This button silences the audible alarm indication. The alarm indicator light will continue to illuminate.

3.2.6 Alarm Test Button

This button activates the Alarm Test Procedure (refer to Section 2.9.2 on page 11).

3.2.7 Sensor Selector Button

This button allows the monitoring panel to sense the temperature in the lower portion of the cabinet. Press, hold, and release this button and the Temperature Display Window will display the temperature in the lower portion of the cabinet.

3.3 Control Panel Functions

Refer to Figure 8 for an illustration of the control panel indicators ar buttons.

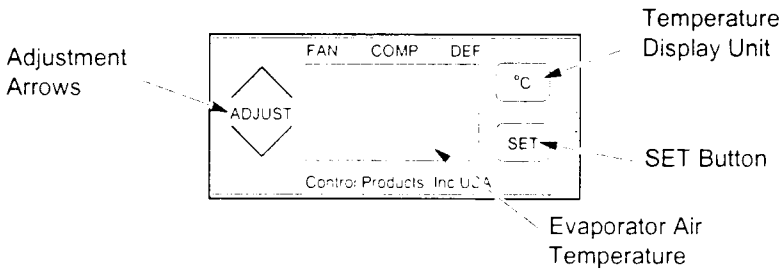


Figure 8. Control Panel

3.3.1 Adjustment Arrows

The up arrow ^ increases values. The down arrow v decreases values.

3.3.2 Temperature Display Unit

This display indicates if the temperature is shown in Fahrenheit or Celsius units.

3.3.3 SET Button

This button allows control setpoint adjustment (refer to Section 3.4 on page 19 for additional information).

3.3.4 Evaporator Air Temperature

This red LED display normally shows the evaporator air temperature inside the refrigerator.

3.4 Temperature Setting

The factory default temperature setting for the Blood Bank Refrigerator is +40°C. When adjusting the temperature, remember that the evaporator setpoint may not be the same as the desired cabinet temperature. For example, an evaporator setpoint of 2°C may be required to keep the cabinet at 4°C.

To change the setpoint temperature on the Blood Bank Refrigerator, complete the following steps:

1. Open the Recorder door (refer to Figure 6 on page 15).
2. Press the SET button to display **SP1**.
3. Press SET again to display the current setpoint value.
4. Use the up ^ arrow or down v arrow to raise or lower the setpoint value.

Note: *Raise or lower the setpoint value* **only 1°C** *then allow the unit to stabilize a minimum of one to two hours at the new setpoint.*

5. Press SET. The display will clear for two seconds, confirming that the new data is in memory.

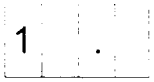
Note: *If further adjustment is necessary, repeat this procedure.*

If the unit starts to warm up, refer to Table 7 on page 43 for troubleshooting information.

3.5 Start Up

To start up the refrigerator, complete the following steps:

1. Plug in the power cord.
2. Insert the key in the switch and turn the power on. When the power switch is turned on, the LED temperature display shows:



   The temperature display has a range of 0 to 19°C. As the temperature in the cabinet drops below 19°C, the display shows the actual cabinet temperature.
3. Allow approximately 24 hours for the unit to reach operating temperature before loading any product in the unit. After the unit has cooled to the desired operating temperature, turn the three position key switch one turn clockwise to the ALARM ON position.
4. Set the alarm. Alarm setpoints are factory set for 5.5 and 1.5°C.

All controls are now fully operational, the alarm is activated, the battery and charger are connected, and all visual indicators are active.

3.6 Usage and Performance

For best results, do not load the refrigerator completely with warm products. The typical recovery time for a full load starting at room temperature is approximately 30 hours.

3.7 Automatic Defrost

The defrosting process is primarily accomplished by air circulated during off-cycle periods.

The defrosting process is started every hour by an electronic controller. Defrost duration is set for 15 minutes. However, if the evaporator coil temperature reaches 4°C before the 15 minutes have expired, then the controller overrides the defrost duration and returns to cooling mode.

Under normal conditions, the temperature warm-up during defrost is virtually unnoticeable. However, an occasional 2°C warm-up is possible if the usage and ambient conditions are severe.

3.8 Remote Alarm

3.8.1 Operating the Alarm

The alarm system is designed to provide visual and audio warning signals for both power failure and rise in temperature. The alarm is equipped with a battery backup.

The Alarm System signals are:

- Green Light: normal operation.
- Red Light: power failure or temperature rise.
- Audio Warning: power failure or temperature rise. This signal can be turned off at any time by pressing the Audio Silence button.

The Audio Silence button allows you to turn off the audio warning without turning off the red warning light.

3.9 Recorder

Recorder operation begins when the system is powered on. Refer to Section 5.4.1.2 on page 29 for information about changing the chart paper and stylus.

4 Theory of Operation

4.1 Refrigeration System Operation

4.1.1 Compressor

The compressor pumps refrigerant through the entire system. The compressor draws the refrigerant vapor into the system through the suction line from the evaporator, compresses the vapor, and delivers it to the discharge line. The high pressure and high temperature refrigerant vapor then enters the condenser.

4.1.2 Condenser

The condenser is the cooling coil for the hot compressed refrigerant gas. The condenser temperature is higher than the ambient room air. This temperature difference results in the condenser releasing most of the heat differential which allows the refrigerant to condense to a liquid under high pressure.

4.1.3 Drier-Strainer

The drier-strainer removes moisture or impurities from the refrigerant. The condensed (liquid) refrigerant leaves the condenser, passes through the drier-strainer, and enters the capillary tube which functions as a metering device.

4.1.4 Capillary Tube

The capillary tube is carefully calibrated in length and inside diameter to meter the exact amount of liquid refrigerant flow required for the refrigerator. The capillary tube is soldered along the exterior of the suction line, forming a heat exchanger which helps to cool the liquid refrigerant in the capillary tube. The capillary tube connects to the evaporator.

4.1.5 Evaporator

The evaporator changes the liquid refrigerant to a gas. The refrigerant leaves the small inside diameter capillary tube and enters the larger evaporator tube. The liquid refrigerant pressure drops, the liquid begins to boil, and changes to a gaseous form. The refrigerant gas moves through the suction line back to the compressor.

5 Maintenance

5.1 General Information

WARNING! Disconnect unit from main power before attempting any maintenance to equipment or controls.

CAUTION! Maintenance should only be performed by trained personnel.

Table 3. Maintenance Schedule

Weekly:	Empty the water accumulated in the Condensate Sump, refer to Figure 2 on page 7. To empty the water, place a container under the sump, remove the plug on the bottom of the sump, and allow the water to drain. Replace the plug when the sump is empty.
Every Six Months:	Clean the Condenser, refer to Section 5.3.1 on page 26.

Table 4. Test Equipment

Description	For use with Kit			
	A	B1	B2	C
Multimeter, Digital	X	X	X	X
Vacuum Pump		X	X	X
Vacuum Gauges		X	X	X
Electronic Thermometer		X	X	X
Electronic Leak Detector		X	X	X
Refrigerant Charge Equipment		X	X	X

4.1.6 Suction Line

The suction line is part of the heat exchanger, which cools the liquid refrigerant in the capillary tube and warms the refrigerant vapor in the suction line. After the refrigerant gas leaves the evaporator, it must pass through the accumulator. The gas then returns to the compressor through the suction line.

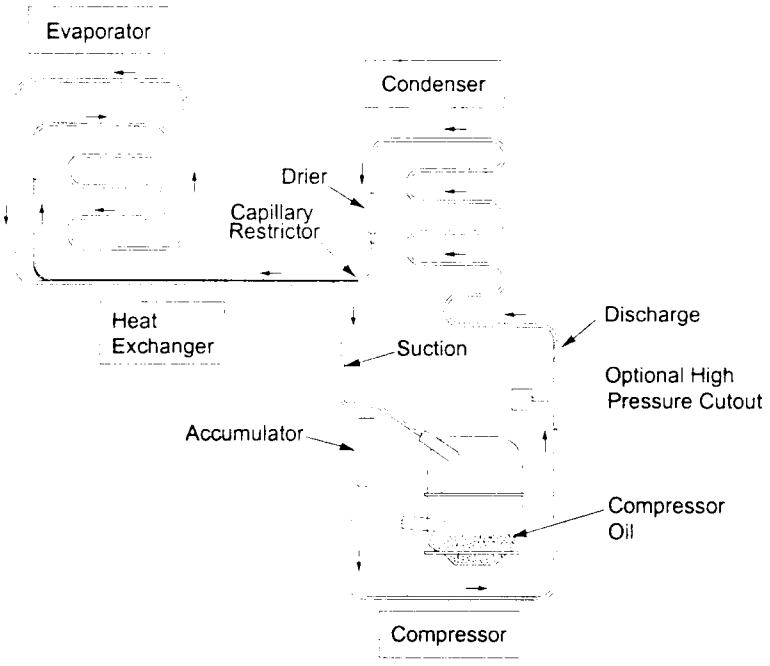


Figure 9. Single Stage System

Table 5. Tools

Description	For use with Kit			
	A	B1	B2	C
Acetylene Torch		X	X	X
Silver Solder		X	X	X
Silver Solder Flux		X	X	X
Screwdriver Set	X	X	X	X
Socket Set	X	X	X	X
Open End/Box End Wrench Set	X	X	X	X
Tubing Cutter		X	X	X
Standard Pliers	X	X	X	X
Needlenose Pliers	X	X	X	X
Vise Grip		X	X	X
Dry Nitrogen w/Regulator and Lines		X	X	X
Copper Flaring Tools		X	X	X
Line Tap Valves		X	X	X
Grit Cloth for cleaning copper prior to welding		X	X	X
Refrigerants		X	X	X
Refrigerant recovery equipment		X	X	X
Extra dryer for recharge		X	X	X

5.2 Refrigeration System Maintenance

The refrigerant used in this unit is R134A. The amount required for recharge is 12 ounces. For safety information refer to the MSDS Safety Data Sheet provided with the unit.

CAUTION! Troubleshooting and maintenance of internal refrigeration system components should only be performed by certified service personnel who are familiar with refrigeration service procedures and with safety and environmental requirements.

Backflushing is required when any refrigeration system component is replaced. Follow standard refrigeration service procedures for pressure and temperature testing, backflushing, evacuation and recovery.

Table 4 on page 23 and Table 5 on page 24 list the recommended test and tool kits for system maintenance. Refer to Figure 3 on page 8 for the location of the condensing unit, which is secured by four bolts.

Note that the tool kit in Table 5 includes an extra dryer to be used only for recharge. It is strongly recommended that to prevent contamination, service personnel should replace the dryer every time maintenance on refrigeration system components is performed.

5.3 Cleaning

WARNING! Disconnect equipment from main power before attempting any maintenance to equipment or its controls.

5.3.1 Condenser

The condenser and the top of the control box should be cleaned every six months. These components are located in the top refrigerator compartment, refer to Figure 10.

CAUTION! Condensers should be cleaned at least every six months. In heavy traffic areas, condensers load with dirt more quickly. Failure to keep the condenser clean can result in equipment warm-up or erratic temperatures.

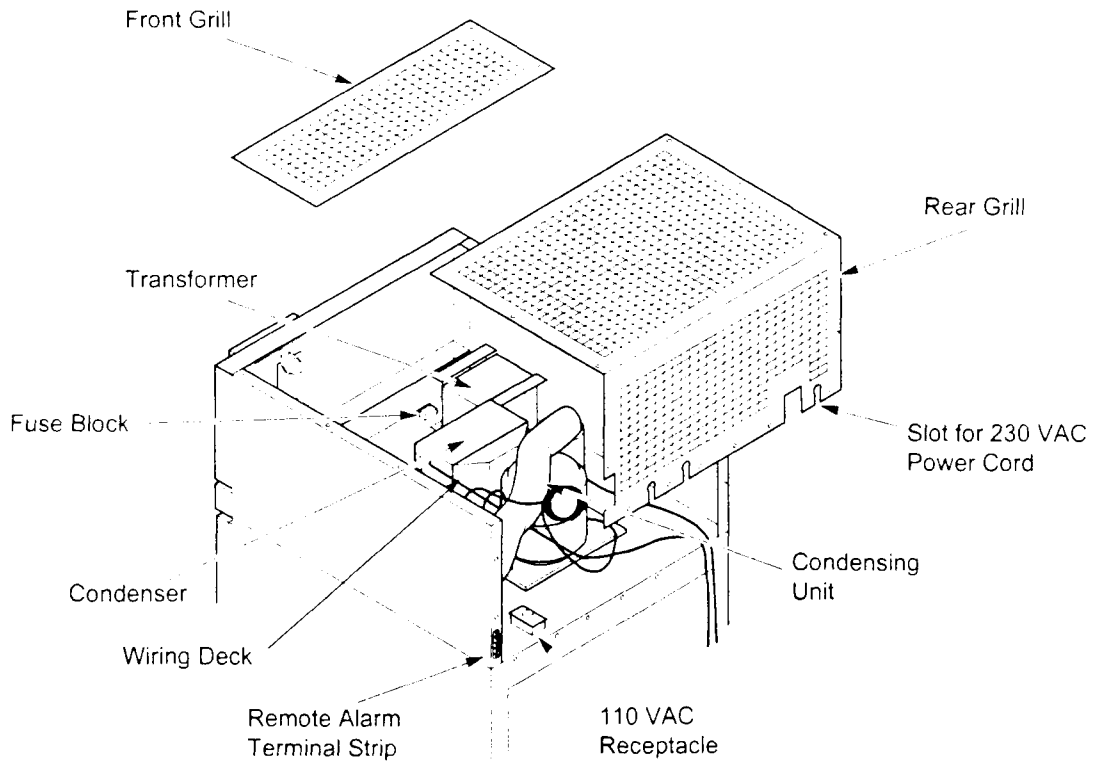


Figure 10. Top Grill Removal

To clean the condenser, complete the following steps:

1. Unplug the refrigerator power cord.
2. Remove the top grills.
3. Use a vacuum cleaner with hose and brush attachments to clean the front face of the finned surface.
4. Replace the top grills.
5. Plug the refrigerator power cord into the power supply.

5.3.2 Drawers

Use a soft cloth and a solution of water and mild detergent to clean the drawers. Rinse the drawers and wipe them dry with a soft cloth.

5.4 Replacement Procedures

This section contains replacement procedures for field replaceable parts. Refer to Section 5.5 on page 41 for information about alternate suppliers and references to illustrations that show the location of replaceable parts. You can also refer to the Repair Parts and Support Kits manual for information about Repair Parts Kits.

5.4.1 Recorder

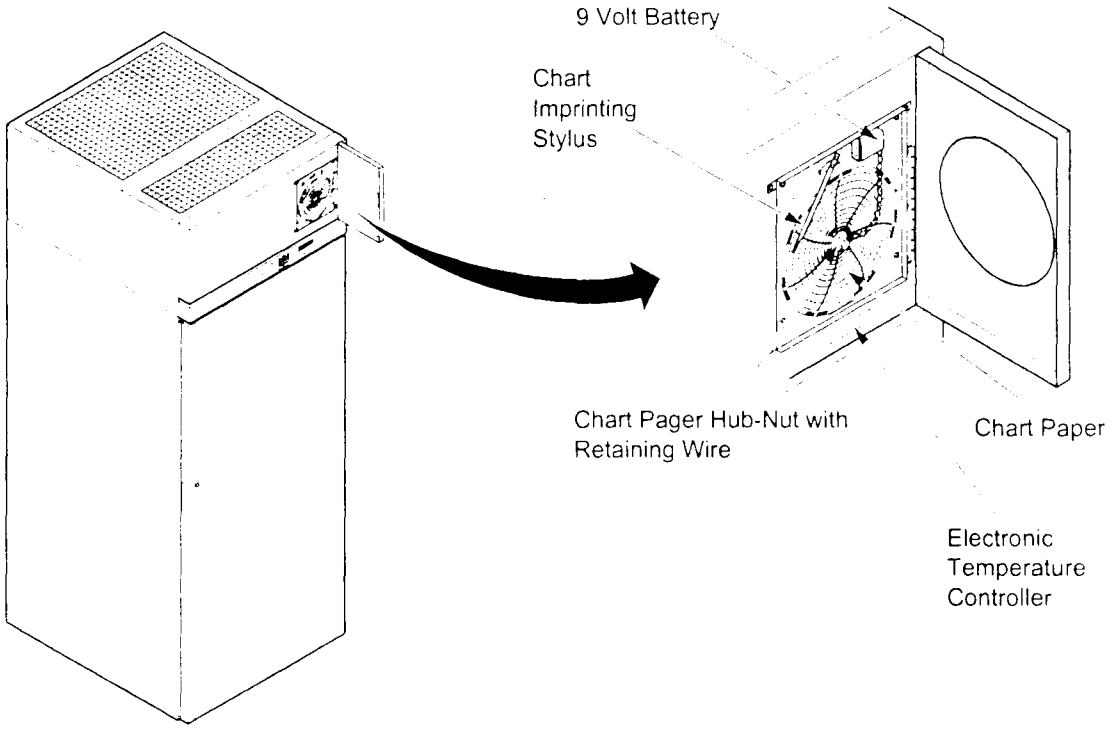


Figure 11. Recorder

5.4.1.1 Power Supply

The recorder normally uses AC power when the system is operating. If AC power fails, the LED indicator flashes to alert you to a power failure. The recorder continues sensing cabinet temperature and the chart continues turning for approximately 24 hours with back-up power provided by the 9 VDC battery. The LED indicator glows continuously when main power is functioning and the battery is charged.

5.4.1.2 Changing the Chart Paper

To change the chart paper, complete the following steps:

1. Locate the pressure-sensitive buttons at the front, upper left of the recorder panel.
2. Press and hold the change chart button for one second. The pen will move off the scale.
3. Unscrew the center nut, remove the old chart paper, and install new chart paper. Carefully align the day and time with the reference mark on the recorder panel.
4. Replace the center nut and hand-tighten. Press the change chart button again to resume temperature recording.

5.4.1.3 Calibration Adjustment

The recorder is accurately calibrated at the factory and retains calibration even during power interruptions. To calibrate the recorder, complete the following steps:

1. Run the unit continuously at bottom-out temperature. Continue steady operation for at least 30 minutes to provide adequate time for recorder response.
2. Measure the cabinet center air temperature with a calibrated temperature monitor.
3. Compare the recorder temperature to the center air temperature. If necessary, adjust the recorder by pressing the left and right chart buttons.

Note: *The stylus does not begin to move until the button is held for five seconds.*

5.4.1.4 Recorder Replacement

To replace the recorder:

1. Disconnect the electrical power supply to the cabinet.
2. Access the recorder power supply by removing the safety panel located over the top front of the cabinet. Remove the screws that secure the top panel and remove the panel.
3. Disconnect the power supply harness leading to the wiring deck of the refrigerator at the wiring deck. This harness consists of several wires leading from the recorder to the wiring deck and terminating at an electrical adapter plug leading to two wires.

4. Loosen the two small screws at the terminal on the recorder and remove the sensor leads: two black wires and one red.
5. Label the lead wires so that they are placed exactly the same in the replacement recorder.
6. Remove the recorder by removing the four screws at the front of the recorder. You may also choose to remove the recorder door.
7. Examine the new recorder to see if the power supply harness is already attached. If it is not attached, remove the power supply wire harness (see Step 3) from the old recorder and attach it to the replacement recorder exactly the same way (unless the replacement recorder comes with updated installation instructions).
8. Install the replacement recorder in the front panel with the same screws removed in step 4.
9. Connect the sensor leads.
10. Connect the power supply to the wiring deck. Refer to step 3.
11. Check the 9-volt back-up battery located on the top front right of the recorder for charge. Replace it if necessary.
12. Replace the top safety panel removed in step 2.
13. Connect the main power supply and check the recorder for operation.

5.4.2 Door Gasket

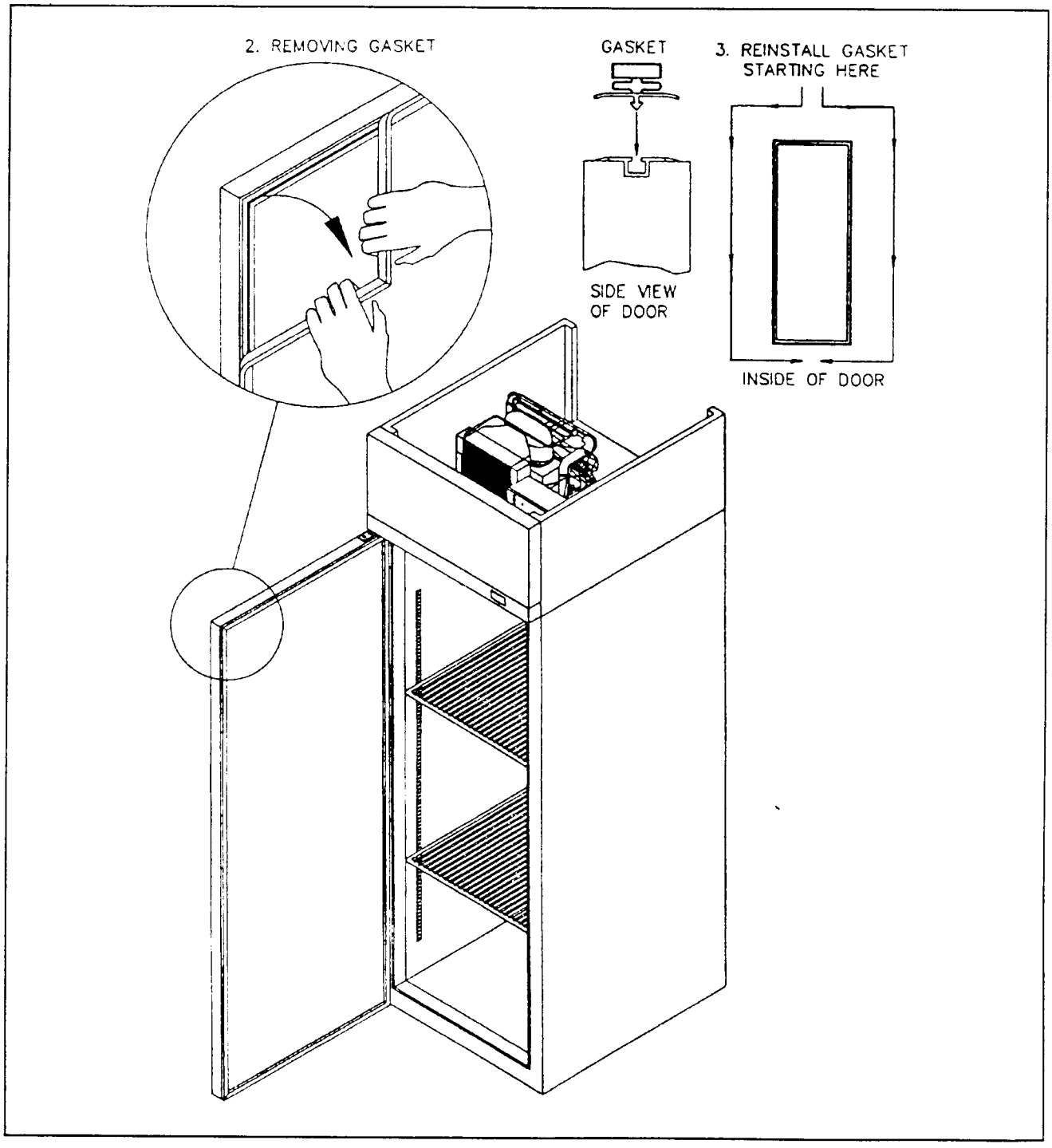


Figure 12. Door Gasket

5.4.2.1 Removing the Door Gasket

To remove the door gasket, start at the corner of the gasket and pull the gasket toward you as shown in Figure 12 on page 31.

5.4.2.2 Installing the Door Gasket

To install the door gasket, start at the top corner of the door and work clockwise, inserting the dart, located at the rear of the gasket, into the retainer on the refrigerator door (refer to Figure 12 on page 31).

5.4.3 Sensor Bottles

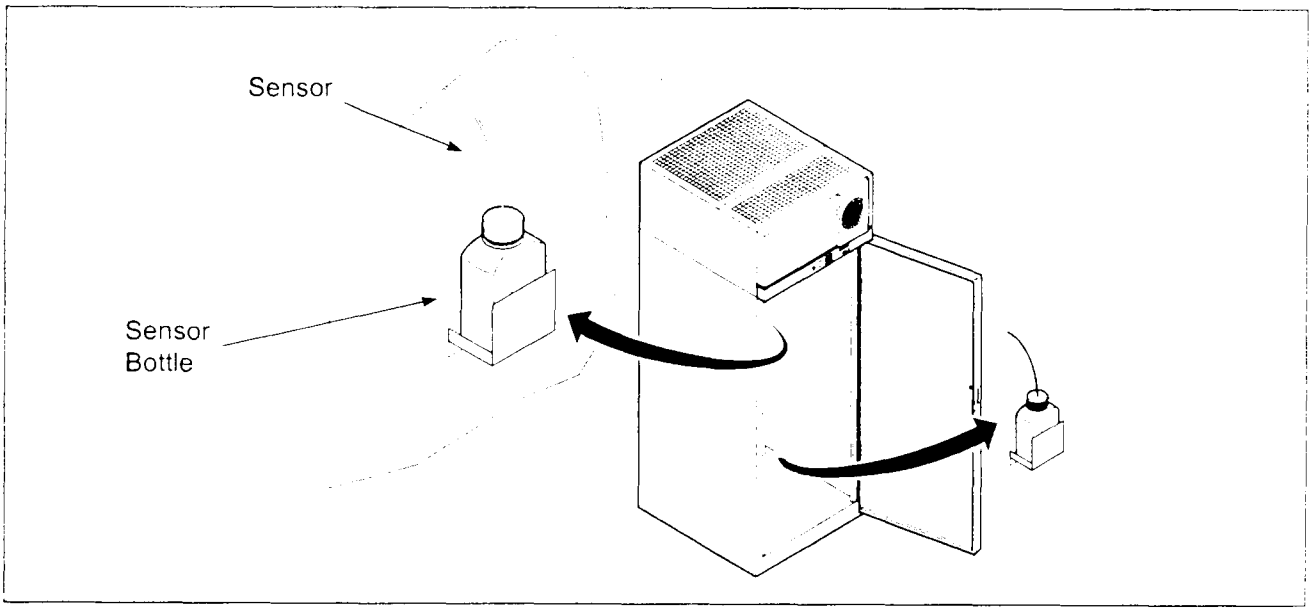


Figure 13. Sensor Bottles

Two sensor bottles contain a mix of glycerine and water to simulate blood samples. These bottles are factory-installed and are located at the top and bottom of the cabinet.

To replace the recorder sensor assembly:

1. Disconnect the electrical power supply to the cabinet.
2. Access the recorder sensor leads by removing the safety panel that is located at the top front of the cabinet (refer to Figure 16 on page 37.) Remove the screws that secure the top panel and remove the panel.
3. Loosen the two small screws at the terminal on the recorder.

4. Remove the sensor leads from the recorder consisting of two black wires and one red.
5. Label the lead wires so that the replacement sensor leads are connected exactly the same to the recorder.
6. The sensor bulb (the opposite end of the sensor lead connections) is located in the glycerine vessel located at the left hand side of the interior of the cabinet. Remove the sensor bulb from the bottle.
7. Remove the sensor harness assembly from the cabinet by sliding it through the port hole at the top left hand side of the cabinet top. Remove sealant located in the port hole.
8. Install the replacement sensor putting the sensor bulb in the glycerine bottle and connecting the leads to the same terminals on the recorder as the sensor was that you removed. Refer to steps 3 through 5.
9. Be sure to reinstall the sealant in the port hole so that warm moist air is not allowed to enter the cabinet during operation.
10. Check the 9-volt back-up battery located on the top front right of the recorder for charge. Replace it if necessary.
11. Replace the top safety panel removed in step 2.
12. Connect the main power supply and check the recorder for operation.

5.4.4 *Fluorescent Light*

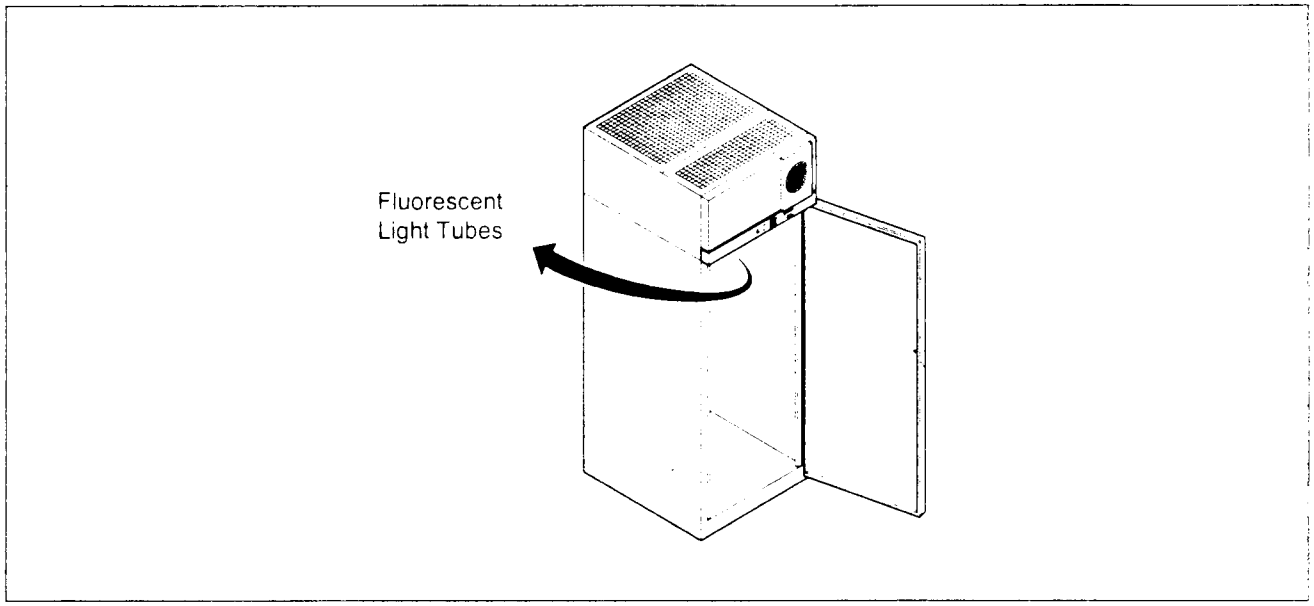


Figure 14. Fluorescent Light Tube Location

The fluorescent light tubes (part number 48902H06) are located at the top front of the interior of the refrigerator. To replace a fluorescent light tube, complete the following steps:

1. Determine which tube has failed.

Note: *It is necessary to remove the bottom bulb to replace the upper bulb.*

2. Disconnect the electrical power supply to the cabinet.
3. Turn the tube 1/2 turn and slide it toward the evaporator and out of the sockets that secure the bulb.
4. Insert the new bulb into the sockets, away from the evaporator, and turn the tube 1/2 turn.
5. Reconnect the electrical power supply to the cabinet and check the light operation.

5.4.5 *Rocker Switch (64151H01)*

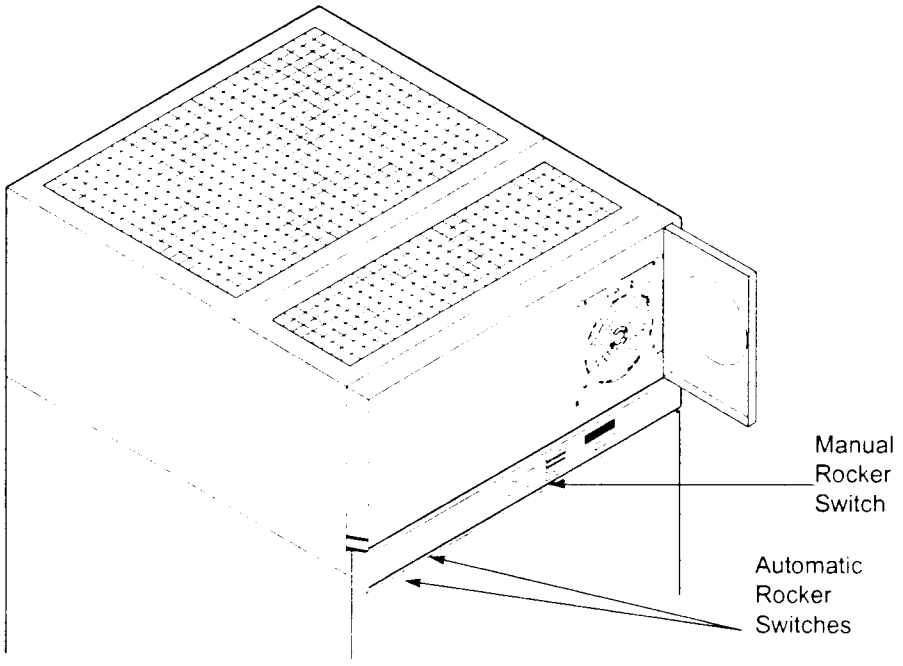


Figure 15. Rocker Switch (64151H01)

The rocker switch (part number 64151H01) is located on the instrument rail, directly above the door in the control panel area and next to the power and alarm switch. This rocker switch manually turns on the fluorescent lights inside the cabinet. To replace the rocker switch, complete the following steps:

1. Determine that the rocker switch needs to be replaced.
2. Disconnect the electrical power supply to the cabinet.
3. Remove the top front panel screws, them remove the top front panel. Locate the wiring harness attached to the switch on the back side of the instrument rail.
4. Disconnect the wiring harness from the switch.
5. Press the plastic clips located at the top and bottom of the switch and simultaneously push the switch through the hole in the control panel.
6. Push the new switch into position and reconnect the wiring harness.
7. Replace the top front panel and screws.
8. Reconnect the electrical power supply to the cabinet and check the switch operation.

5.4.6 *Rocker Switch (46731H02)*

The rocker switches (part number 46731H02) are located in the instrument rail, directly above the door. One switch activates the door ajar indicator on the control panel and one turns on the fluorescent lights inside the cabinet. To replace a rocker switch, complete the following steps:

1. Determine which rocker switch needs to be replaced.
2. Disconnect the electrical power supply to the cabinet.
3. Remove the top front panel screws, them remove the top front panel. Locate the wiring harness attached to the switch on the back side of the instrument rail.
4. Disconnect the wiring harness from the switch.
5. Press the plastic clips located at the top and bottom of the switch and simultaneously push the switch through the hole in the control panel.
6. Push the new switch into position and reconnect the wiring harness.
7. Replace the top front panel and screws.
8. Reconnect the electrical power supply to the cabinet and check the switch operation.

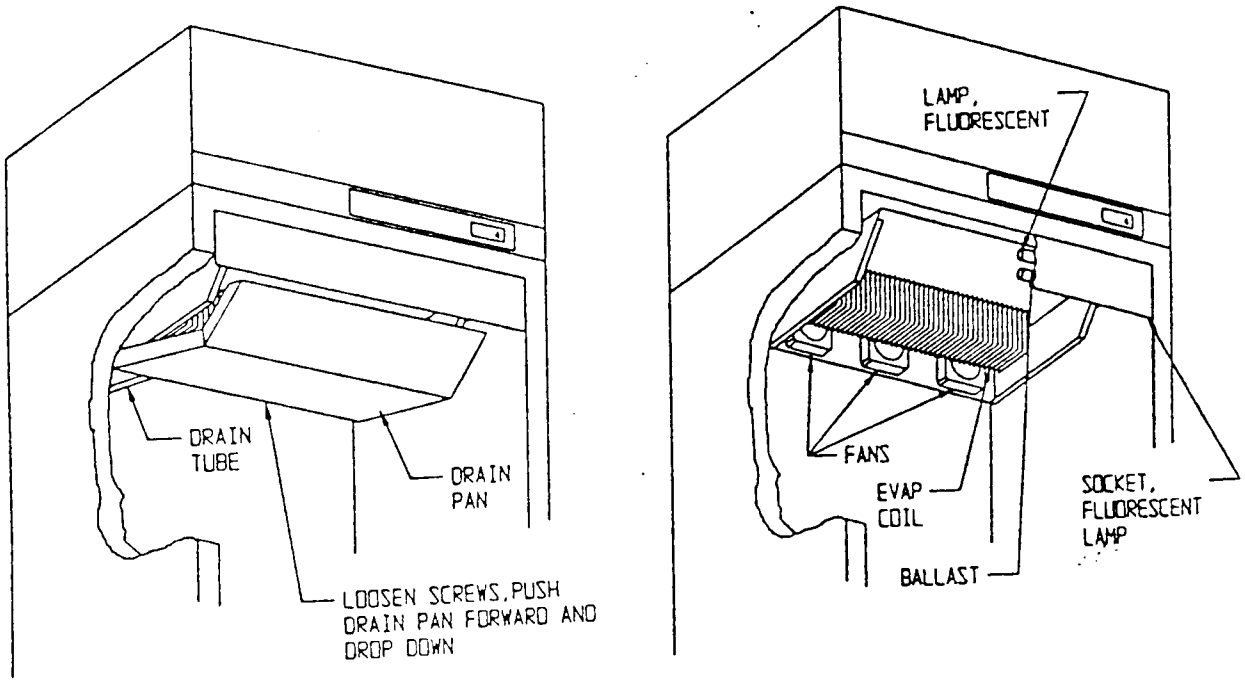


Figure 16. Replacing Parts at Interior Top of Cabinet

5.4.7 Fan Motor

There are three fan motors (part number 88789H01) located at the rear of the evaporator inside the refrigerator. Refer to Figure 16 on page 37.

To replace a fan motor, complete the following steps:

1. Disconnect the electrical power supply to the cabinet.
2. Remove the upper drawers of the refrigerator to access the evaporator drain pan. Refer to Section 2.11.1 on page 13 for the drawer removal procedure.
3. Remove the air baffles at each side of and below the evaporator assembly.
4. Remove the clamp fastening the trap extending to the rear of the cabinet through the cabinet rear wall. Remove the evaporator drain pan drain tube trap.
5. Remove the fluorescent lights. Refer to Section 5.4.4 on page 34.
6. Remove the screws from the rear edge of the drain pan, directly below the fan motors on the evaporator housing. Gently push the drain pan toward the front of the cabinet and remove the pan from the cabinet.
7. Remove the four fasteners holding the fan assembly at each corner.

Note: *The fan assembly fasteners are shakeproof and resist removal. Save the fasteners removed and use those fasteners to attach the new fan motor.*

8. Reverse the above procedures to install the new fan motor and reassemble the unit.

5.4.8 *Ballast Replacement*

Refer to Figure 16 on page 37 for location of ballast.

To replace the ballast:

1. Disconnect the electrical power supply to the cabinet.
2. Access the ballast by removing the fluorescent light assembly located in front of the evaporator assembly inside the cabinet interior top front.
3. First, remove the fluorescent lamps.
4. Extract the four screws located on the front of the light deflector. The screws are concealed with a white plastic cap.
5. To avoid further disassembly of the evaporator coil assembly to reach the power supply harness plug, have another person hold the fluorescent fixture while replacement of the ballast takes place.
6. Remove the ballast by extracting the screws holding it. Loosening one screw and removing the other should be sufficient.
7. Disconnect wiring from the ballast, but be sure to connect the replacement ballast exactly as the ballast is that is removed. Label the wires so that you can replace them exactly the same way.
8. Reverse steps for reassembly of the fluorescent fixture. Be sure that the wires do not become pinched or electrically shorted during the reassembly procedure.
9. Tape the wires in place to avoid the possibility of them falling into a pinch area. Use the same fasteners as the ones removed.
10. Connect the main power supply and check the light operation.

5.4.9 *Gel Cell Battery Replacement*

The gel cell battery powers digital display on the front panel. The location of the gel cell battery is shown in Figure 3 on page 8. To replace the gel cell battery:

1. Disconnect the electrical power supply to the cabinet.
2. Access the battery by removing the safety panel that is located over the top front of the cabinet, as shown in Figure 16 on page 37. Remove the screws that secure the top panel and remove the panel.
3. Disconnect the two wires leading to the battery. Label the wire leading to the positive connection of the battery. Positive connection of battery is labeled with a red mark on the battery.
4. Remove the battery by first removing the one screw located in the vertical plane in the bracket securing the battery to the main battery housing.
5. Reverse steps for battery replacement.
6. Check for digital display operation, replace the top safety panel and reconnect the power supply to the cabinet.

5.5 Replacement Parts

Table 6 below lists all replaceable parts. If you can obtain a part from an alternate supplier, the supplier name and part number are listed. If a part can only be obtained from Harris, the Alternate Supplier column reads "Harris only".

Table 6. Replacement Parts and Suppliers

Item No.	Harris Mfg. Part No.	Item Name	Figure Reference	Alternate Supplier	Alternate Part Number
1	46731H02	Switch, Rocker	Figure 15 on page 35	Littlefuse	780102
2	48902H06	Lamp, Fluor.	Figure 14 on page 34	Phillips	F15T8/CW
3	64151H01	Switch, Rocker	Figure 15 on page 35	Carling	RA901-VB-B-O-V
4	88789H01	Motor, Fan	Figure 16 on page 37	Bomax	903-2329
5	60678H02	Battery, Gel Cell	Figure 3 on page 8	CSB Battery of America	GP12-12
6	E04J-30	Fuse, 30 amp	Figure 3 on page 8	Gould	ATQ30
7	39430H05	Fuse, 30 amp time delay	Figure 3 on page 8	Gould	ATDR30
8	39757H01	Plug, Drain	Figure 2 on page 7	Harris only	
9	39701H01	9 volt battery	Figure 1 on page 1	(any Alkaline 9V OK)	
10	39448H01	Recorder	Figure 11 on page 28	Cobex Recorders, Inc.	C916
11	85089G10	Sensor Assy.	—	Harris only	
12	82480H01	Ballast, 2-lamp	Figure 16 on page 37	Advance	RL2SP20TP
13	300246H01	Control Assy.	Figure 8 on page 18	Control Products, Inc.	TDC-111-12VDC-001
14	34313H02	Board, Circuit	Figure 1 on page 1	Harris only	
15	47303H15	Refrigerant 134a	—	Dupont	R-134A
16	40371H07	Dryer	Figure 17 on page 49	Parker-Hannifin	057951-00
17	39247H01	Fuse Block	Figure 3 on page 8	Bussmann	BCCM60335Q
18	60594H31	Condensing Unit	Figure 3 on page 8	Copeland Corp.	M2AH-0033-1AA-103
19	34724H01	Relay	—	Gentron	SSR600240D25003
20	33547G05	Cntrl, HiPres Assy	—	Harris only	

Item No.	Harris Mfg. Part No.	Item Name	Figure Reference	Alternate Supplier	Alternate Part Number
21	26860H02	Coil, Evaporator	Figure 16 on page 37	Super Radiator	0947834-B000
22	81280H01	Slide, Drawer	Figure 5 on page 12	Jonathon Mfg.	310742
23	34796H01	Harness, Rem/Bat	—	Harris only	
24	49060H01	Caster	Figure 2 on page 7	Bassick	9009XTS
25	34527H01	Harness, Dr Sw	Figure 3 on page 8	Harris only	
26	36560G01	Refrigeration Service Aperture	—	Harris only	
27	60196G01	Condensate Sump	Figure 2 on page 7	Harris only	
28	90520H11	Chart, Paper	Figure 11 on page 28	United Electric	6282-240
29	81100G13	Harness, Sensor	—	Harris only	
30	81100G12	Harness, Sensor	—	Harris only	
31	82481H01	Socket, Fl. Lamp	Figure 16 on page 37	H.H.	826W
32	69374H01	Relay, SPST	—	Aromat	VC20-1A-AC120V-K
33	29423G09/ 29423G10	Cord, Serv. 20A	Figure 2 on page 7	Harris only	
34	34196H01	Overlay, monitor panel	Figure 7 on page 16	Harris only	
35	89820H70	Harn., Key Switch	—	Harris only	
36	33529H01	Harn., Cont Pan	—	Harris only	
37	33529H02	Harn., Cont Pan	—	Harris only	
38	33807G11	Solid Door	—	Harris only	
39	33534H01/H02	Top Hinge Brkt	—	Harris only	
40	33535H01/H02	Bot. Hinge Brkt	—	Harris only	
41	49231H02	Hinge Power Cartridge	—	Standard-Keil	2899-5662-2000
42	34205H01	Door Handle	—	Harris only	
43	38497H02	Gasket, Door	Figure 12 on page 31	Harris only	
44	41026H59	Transformer	Figure 3 on page 8	Acme Transformer	TA-1-81220
45	80080G06	Sensr Bottle Assy	Figure 13 on page 32	Harris only	
46	80080G07	Sensr Bottle Assy	Figure 13 on page 32	Harris only	
47	69070H05	Switch, Key	Figure 7 on page 16	C&K	A3151U2A8SZRQ

6 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

This section is a guide to troubleshooting equipment problems.

Table 7. Troubleshooting Procedures

Problem	Cause	Solution
Unit does not operate or Power Failure Indicator is on.	Power supply	1. Check that the cord is securely plugged in. 2. Plug another appliance into the outlet to see if it is live. 3. If the outlet is dead, check the circuit breaker or fuses.
Temperature fluctuates.	Cold control	Make sure that the cold control is set correctly. Refer to Section 3.4 on page 19.
	Condenser	Make sure the condenser is clean. Refer to Section 5.3 on page 26.
	High pressure	Check the system high-pressure cut-out button. This is an encapsulated control with a rubber boot over the reset button. To reset the control, push it down; use a blunt instrument to avoid tearing the boot.
Unit warms up.	Door is open.	Make sure the door is completely closed.
	Warm product recently loaded in unit.	Allow ample time to recover from loading the warm product.
	Power supply	Check for proper voltage to the unit. If there is no voltage to the unit, call an electrician.
	Compressor	1. If the compressor is not running, check the power failure alarm. If the power failure alarm light is on, have an electrician check for proper voltage to the unit. 2. If the compressor is running, open the door and look through the slotted air intake in the bottom of the evaporator cover to see if icing is present on the evaporator. If icing is present, check for the following: a. No air flow behind evaporator. Call technical service for assistance. The evaporator fans may be inoperative. b. Door is left ajar, heavy loading, or excessive door openings. Close the door and allow the unit to stabilize. 3. If the compressor is running and there is airflow behind the evaporator, contact an authorized service provider or call technical service for assistance.

7 Accessories

Table 8. Accessories

Description	Catalog No.
Alarm Systems	
Standard Remote Alarm. Provides an audible and visual signal in the event of temperature rise or power failure. Adaptable to telephone switchboard. Can be located up to 1/3 mile (1760 ft/536 m) from cabinet. Must be used with electronic alarm system and connected to Normally Open or Normally Closed remote alarm contacts. Wire not included. Specify voltage when ordering.	5612
Deluxe Electronic Remote Alarm System. User programmable to sound alarm in the event of temperature rise or power failure. Can dial up to four telephone numbers to advise of alarm condition across any telephone system which accepts pulse dialing. One System can monitor up to four individual cabinets. In addition, the System can monitor up to three groups of cabinets. Contact Harris/P-H for detailed specifications. Customer installed.	6224
Temperature Recorders	
Temperature recorder, 6 in. circular chart, seven-day drive, panel mounted. Factory installed. Specify when ordering.	6183-7
Temperature recorder, 6 in. circular chart, seven-day drive, free-standing, for all refrigerator models, -20°C and -30°C freezers. Customer installed. Specify voltage when ordering.	6383-7
Chart Paper	
Chart paper, package of 50, for 6 in., seven-day recorder, -40°C to +25°C.	6184
Low Voltage Protection	
Voltage Safeguard. Free-standing. Helps protect electrical equipment from damage by boosting low voltage automatically. Provided with terminal board for direct wiring. Field installed. Specify voltage when ordering.	5575
Casters	
Dual-Wheel Casters. Set of four, 2 in. diameter.	6041
Drawers	
For LR-3004, roll-out drawer assembly, six additional stainless steel drawers, fully adjustable, fully extendable.	6704
Extended Warranty Options	
Note: In addition to Harris/P-H standard 12-Month full warranty on the complete product (USA and Canada), Harris/P-H can supply an additional four year protection on compressor and compressor parts. This additional coverage must be purchased at the time of original product purchase. Under this contract, Harris/P-H agrees to furnish a compressor FOB our factory to replace one which has been determined to be defective by Harris/P-H or a factory authorized Harris/P-H Service Agency.	

8 Warranty

8.1 Domestic Warranty 12 Months Full Warranty, Parts and Labor United States of America and Canada

Harris Manufacturing, P-H Division warrants this product to the owner for a period of twelve (12) months from date of shipment by Harris/P-H. Under this warranty, Harris/P-H, through its authorized service organizations, will repair, or at its option, replace any part found to contain a manufacturing defect in material or workmanship without charge to the owner for parts, service labor, or any shipping or cartage costs. Replacement or repaired parts will be warranted for only the unexpired portion of the original warranty. This warranty is limited to products purchased and installed in the United States of America and Canada. It does not apply to damage caused by accident, misuse, fire, flood, or acts of God. It does not apply to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

To obtain prompt warranty service, simply contact the nearest authorized service center or dealer listed in the directory enclosed with each product. Harris/P-H's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Harris/P-H's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

8.2 International Warranty 16 Months Parts Warranty

Harris Manufacturing, P-H Division warrants this product to the owner for a period of sixteen (16) months from the date of shipment by Harris/P-H. If any part is found to contain a manufacturing defect in material or workmanship, Harris/P-H assumes no responsibility for any labor expenses for service, removal, or reinstallation required to replace part, or for incidental repairs, and such costs are the responsibility of the Owner unless a service labor agreement exists between the Owner and his Dealer.

The warranty does not apply to damage caused by accident, misuse, fire, flood, or acts of God, or to defects resulting from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided.

To obtain prompt warranty service, simply contact the Dealer from whom you purchased the product or the nearest Dealer handling

Harris/P-H Products. Harris/P-H's own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Harris/P-H's sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

8.3 Extended Warranty Options

Optional warranty extensions are available by special order. Contact your Dealer for more information on 12-month compressor parts warranties and 12-month compressive parts and labor warranty extensions.

9 Diagrams

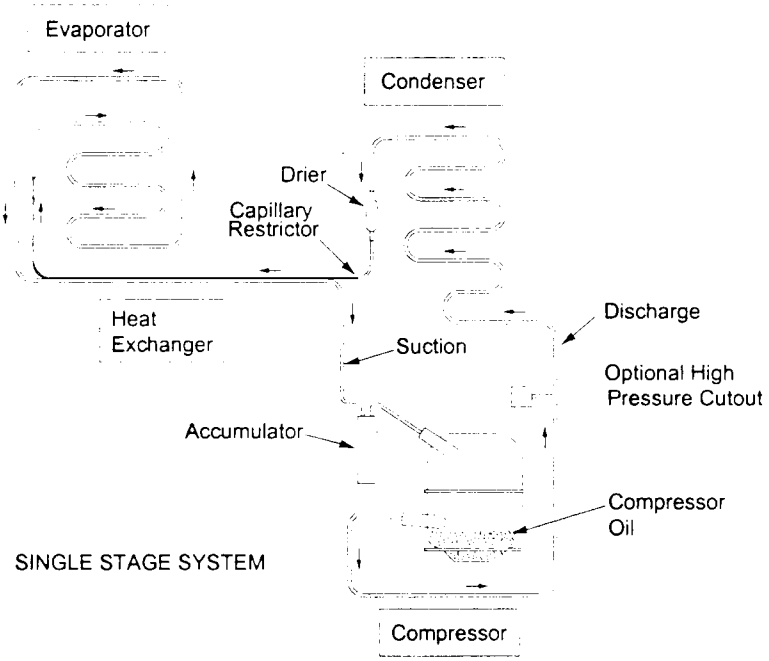
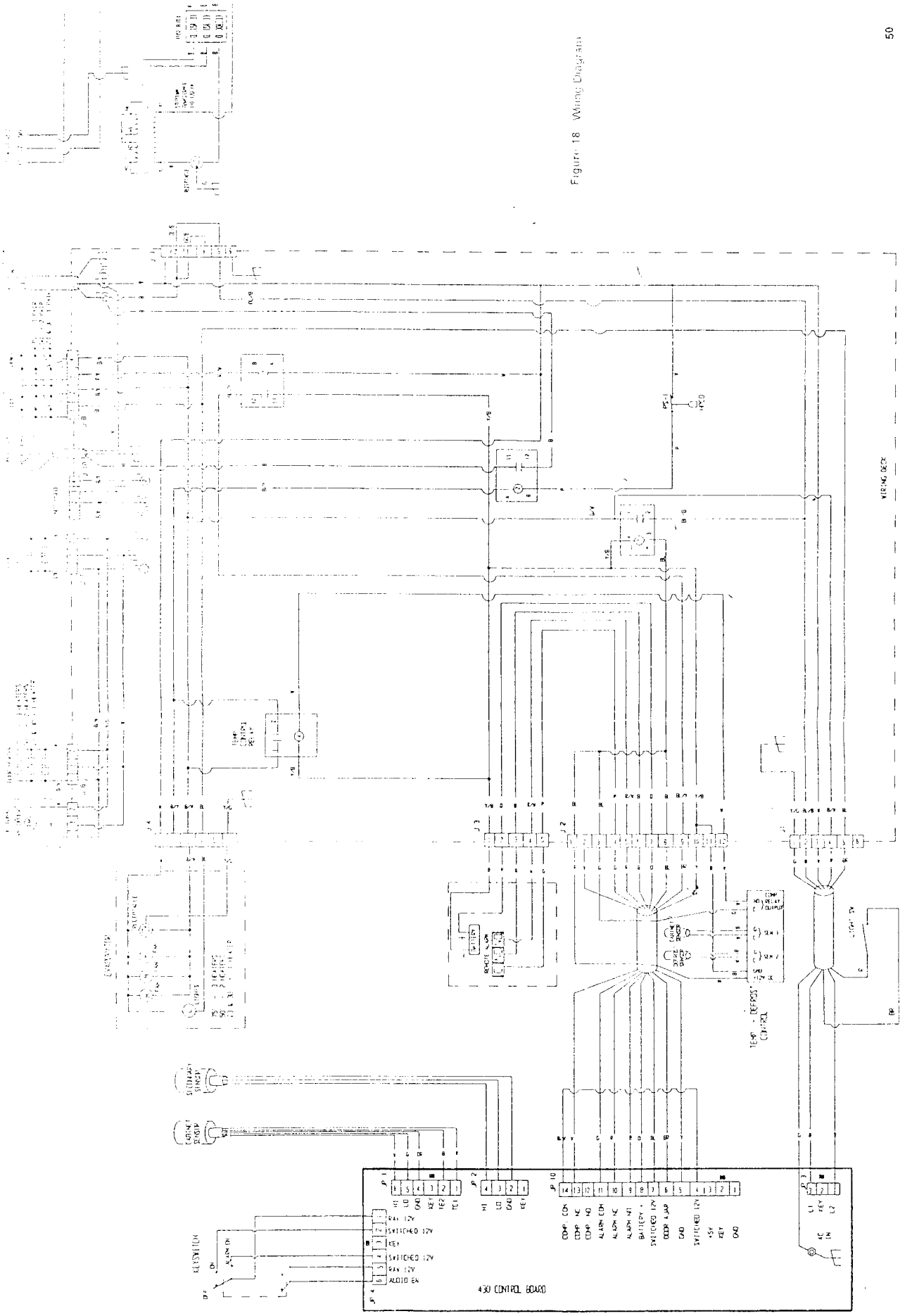


Figure 17. Piping Diagram

Figure 18 Wiring Diagram


WIRING DECK
TEMP - DEFROST CONTROL
430 CONTROL BOARD
RESTRICTION
LEGEND :
R - RED
B - BLACK
BL - BLUE
BR - BROWN
GR - GREY
G - GREEN
Y - YELLOW
W - WHITE
O - ORANGE
P - PURPLE
T - TAN
/ - SIGNIFIES WIRE TRACE
WIRES CONNECTED
WIRES NOT CONNECTED
NC PRESS. SW. OPENS ON RISE
NO PRESS. SW. CLOSES ON DROP
NO TEMP. SW. CLOSES ON RISE
TIMER MOTOR
FAN MOTOR
RELAY CONTACTS - NO
NOTE: DOOR SWITCHES ARE OPDT. UNIT HAS ONE OPDT SWITCH PER DOOR. IE: SOFT. HAS 2, 75 FT. HAS 3. SWITCHES ARE CONNECTED IN PARALLEL, SWITCHES ARE SHOWN WITH DOORS CLOSED.

300007H01A
WIRING DIAGRAM
30 CU. FT. MILITARY
BLOOD BANK

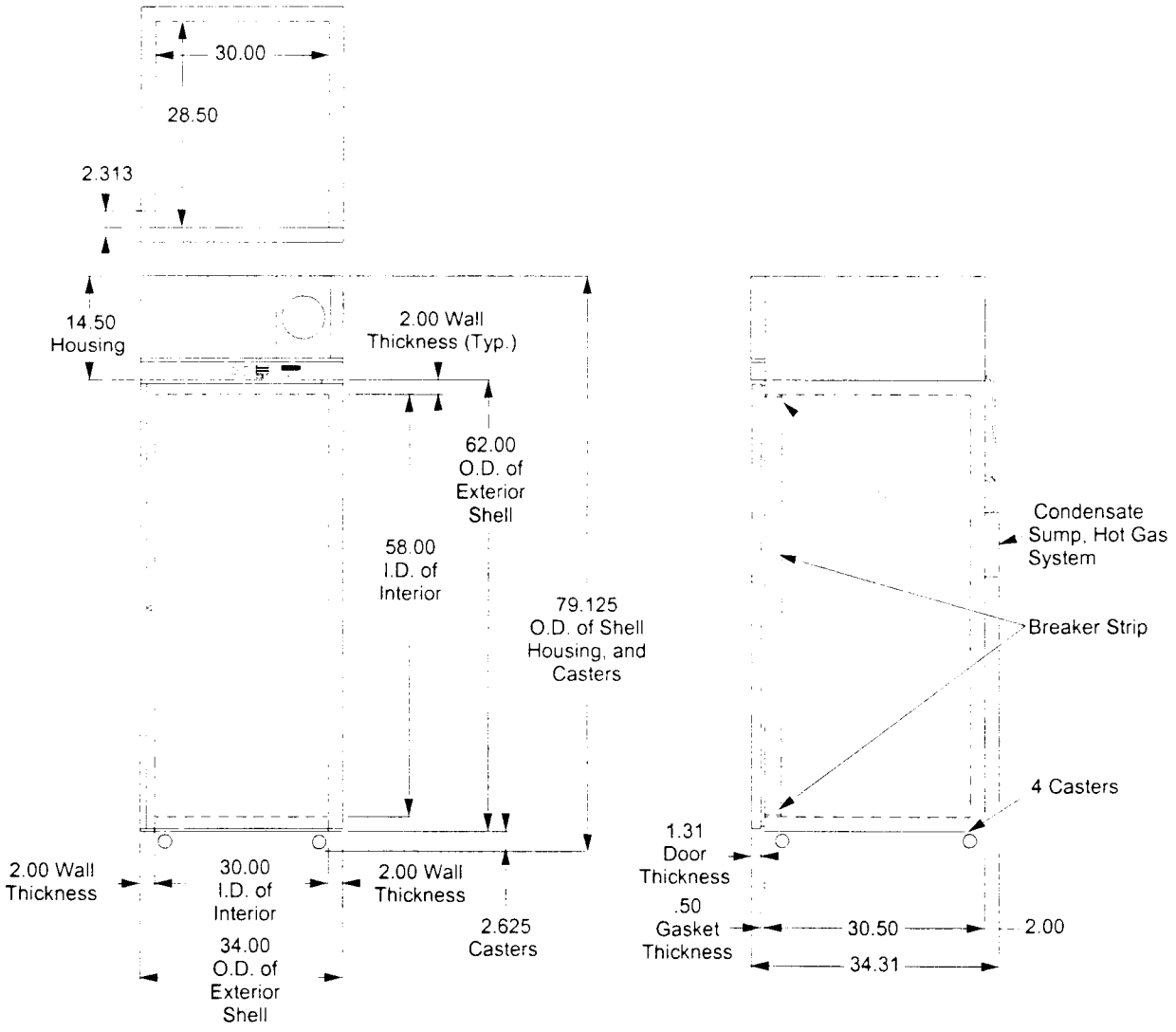


Figure 19. Dimension Diagram

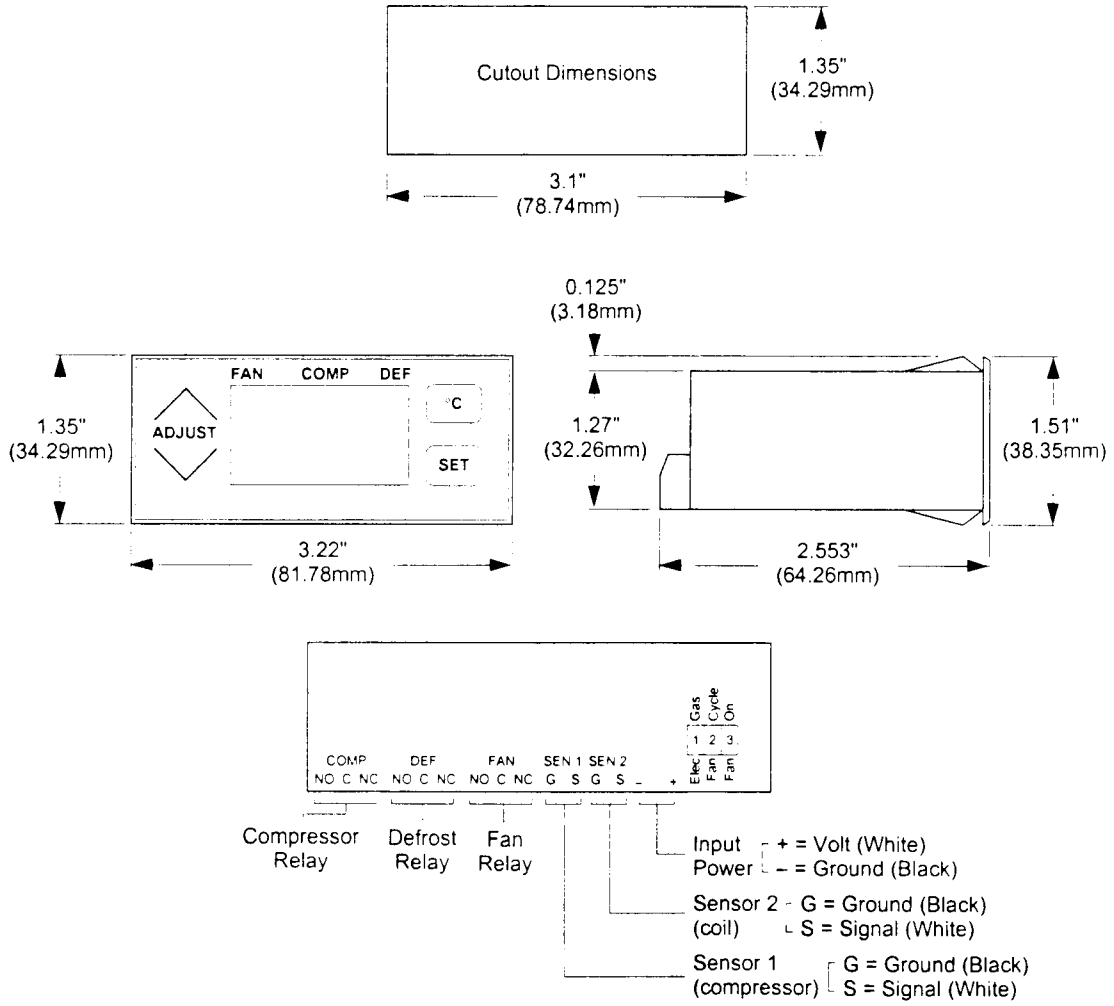


Figure 20. Control Wiring Diagram

Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

Date Purchased: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (Harris/P-H or specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

Harris/P-H SALES DIVISION

Phone:	704/658-2711 800/221-4201
FAX:	704/658-0363

LABORATORY PARTS and SERVICE

Phone:	800/438-4851
FAX:	704/658-2576

TECHNICAL SUPPORT

Phone:	800/438-4851

Harris Mfg.
P-H Div.
275 Aiken Road
Asheville, NC 28804
U.S.A.

Harris Mfg.
P-H Div.

Repair Parts and Support Kits for 30 cu. ft. Blood Bank Refrigerator

34830H12

© June, 1996 Harris/P-H
All rights reserved
Printed in U.S.A.

List of Tables

Table 1. Abbreviation Key for Replacement Parts Tables 1
Table 2. Kit A 2
Table 3. Kit B1 2
Table 4. Kit B2 3
Table 5. Kit C 4

This Page Intentionally Left Blank.

There are four Repair Parts Support Kits available for the 30 cu. ft. Blood Bank Refrigerator:

- Kit A contains high mortality repair parts such as fuses and lamps (refer to Table 2 on page 2).
- Kit B1 contains the items in Kit A and a broader range of repair parts, spare parts, and printed circuit boards (refer to Table 3 on page 2).
- Kit B2 contains the items in Kit A and Kit B1 plus additional parts (refer to Table 4 on page 3).
- Kit C contains the items in Kit A, Kit B1, and Kit B2 plus additional parts necessary to complete comprehensive repair and rebuild actions (refer to Table 5 on page 4).

Note: *Refer to Table 1 on page 1 for descriptions of the abbreviations used in the repair parts tables.*

Table 1. Abbreviation Key for Replacement Parts Tables

Abbreviation	Description	
U/A	Unit of Measure	
EC	Essentiality Code	
	1	Failure of this part will render the end item inoperable.
	3	Failure of this part will not render the end item inoperable.
	5	The part does not qualify for Code 1 assignment but is needed for personnel safety.
	6	The part does not qualify for Code 1 assignment but is needed for legal, climatic, or other requirements specific to the planned operational environment for the end item.
	7	The part does not qualify for Code 1 assignment but is needed to prevent impairment or temporary reduction of operational effectiveness for the end item.
SL	Shelf Life	
PLT	Production Lead Time	
Qty/EI	Quantity per End Item	
QUP	Quantity Unit Pack	
TQ Rec	Total Quantity Recommended	

Table 2. Kit A

Item No.	Part No.	Item Name	U/A	EC	SL	PLT	Qty/ EI	QUP	TQ Rec
1	46731H02	Switch, Rocker	ea	7	X	2	2	1	1
2	48902H06	Lamp, Fluor.	ea	6	X	2	2	1	2
3	64151H01	Switch, Rocker	ea	7	X	2	1	1	1
4	88789H01	Motor, Fan	ea	1	X	2	2	1	2
5	60678H02	Battery, Gel Cell	ea	7	X	2	1	1	1
6	E04J-30	Fuse, 30 amp	ea	1	X	2	1	1	1
7	39430H05	Fuse, 30 amp time delay	ea	7	X	2	2	2	2
8	39757H01	Plug, Drain	ea	1	X	2	1	1	1
9	39701H01	9 volt battery	ea	7	X	2	1	1	1

Table 3. Kit B1

Item No.	Part No.	Item Name	U/A	EC	SL	PLT	Qty/ EI	QUP	TQ
1	46731H02	Switch, Rocker	ea	7	X	2	2	1	1
2	48902H06	Lamp, Fluor.	ea	6	X	2	2	1	2
3	64151H01	Switch, Rocker	ea	7	X	2	1	1	1
4	88789H01	Motor, Fan	ea	1	X	2	2	1	2
5	60678H02	Battery, Gel Cell	ea	7	X	2	1	1	1
6	E04J-30	Fuse, 30 amp	ea	1	X	2	1	1	1
7	39430H05	Fuse, 30 amp time delay	ea	7	X	2	2	2	2
8	39757H01	Plug, Drain	ea	7	X	2	1	1	1
9	39701H01	9 volt battery	ea	7	X	2	1	1	1
10	39448H01	Recorder	ea	7	X	2	1	1	1
11	85089G10	Sensor Assy.	ea	1	X	2	1	1	1
12	82480H01	Ballast, 2-lamp	ea	6	X	2	1	1	1
13	300246H01	Control Assy.	ea	1	X	2	1	1	1
14	34313H02	Board, Circuit	ea	1	X	2	1	1	1
15	47303H15	Refrigerant 134A	lb.	1	X	2	.75	.75	.75
16	40371H07	Dryer	ea	1	X	2	1	1	1
17	39247H01	Fuse Block	ea	1	X	2	1	1	1

Table 4. Kit B2

Item No.	Part No.	Item Name	U/A	EC	SL	PLT	Qty/ EI	QUP	TQ
1	46731H02	Switch, Rocker	ea	7	X	2	2	1	1
2	48902H06	Lamp, Fluor.	ea	6	X	2	2	1	2
3	64151H01	Switch, Rocker	ea	7	X	2	1	1	1
4	88789H01	Motor, Fan	ea	1	X	2	2	1	2
5	60678H02	Battery, Gel Cell	ea	7	X	2	1	1	1
6	E04J-30	Fuse, 30 amp	ea	1	X	2	1	1	1
7	39430H05	Fuse, 30 amp time delay	ea	7	X	2	2	2	2
8	39757H01	Plug, Drain	ea	7	X	2	1	1	1
9	39701H01	9 volt battery	ea	7	X	2	1	1	1
10	39448H01	Recorder	ea	7	X	2	1	1	1
11	85089G10	Sensor Assy.	ea	1	X	2	1	1	1
12	82480H01	Ballast, 2-lamp	ea	6	X	2	1	1	1
13	300246H01	Control Assy.	ea	1	X	2	1	1	1
14	34313H02	Board, Circuit	ea	1	X	2	1	1	1
15	47303H15	Refrigerant 134A	lb.	1	X	2	.75	.75	.75
16	40371H07	Dryer	ea	1	X	2	1	1	1
17	39247H01	Fuse Block	ea	1	X	2	1	1	1
18	60594H31	Condensing Unit	ea	1	X	2	1	1	1
19	34724H01	Relay	ea	1	X	2	1	1	1
20	33547G05	Cntrl, HiPres Assy	ea	1	X	2	1	1	1
21	26860H02	Coil, Evaporator	ea	1	X	2	1	1	1
22	81280H01	Slide, Drawer	ea	7	X	2	14	14	14

Table 5. Kit C

Item No.	Part No.	Item Name	U/A	EC	SL	PLT	Qty/ El	QUP	TQ
1	46731H02	Switch, Rocker	ea	7	X	2	2	1	1
2	48902H06	Lamp, Fluor.	ea	6	X	2	2	1	2
3	64151H01	Switch, Rocker	ea	7	X	2	1	1	1
4	88789H01	Motor, Fan	ea	1	X	2	2	1	2
5	60678H02	Battery, Gel Cell	ea	7	X	2	1	1	1
6	E04J-30	Fuse, 30 amp	ea	1	X	2	1	1	1
7	39430H05	Fuse, 30 amp time delay	ea	7	X	2	2	2	2
8	39757H01	Plug, Drain	ea	7	X	2	1	1	1
9	39701H01	9 volt battery	ea	7	X	2	1	1	1
10	39448H01	Recorder	ea	7	X	2	1	1	1
11	85089G10	Sensor Assy.	ea	1	X	2	1	1	1
12	82480H01	Ballast, 2-lamp	ea	6	X	2	1	1	1
13	300246H01	Control Assy.	ea	1	X	2	1	1	1
14	34313H02	Board, Circuit	ea	1	X	2	1	1	1
15	47303H15	Refrigerant 134A	lb.	1	X	2	.75	.75	.75
16	40371H07	Dryer	ea	1	X	2	1	1	1
17	39247H01	Fuse Block	ea	1	X	2	1	1	1
18	60594H31	Condensing Unit	ea	1	X	2	1	1	1
19	34724H01	Relay	ea	1	X	2	1	1	1
20	33547G05	Cntrl, HiPres Assy	ea	1	X	2	1	1	1
21	26860H02	Coil, Evaporator	ea	1	X	2	1	1	1
22	81280H01	Slide, Drawer	ea	7	X	2	14	14	14
23	34796H01	Harness, Rem/Bat	ea	7	X	2	1	1	1
24	49060H01	Caster	ea	6	X	2	4	1	4
25	34527H01	Harness, Dr Sw	ea	1	X	2	1	1	1
26	36560G01	Service Aperture	ea	1	X	2	1	1	1
27	60196G01	Condensate Sump	ea	3	X	2	1	1	1
28	90520H11	Chart, Paper	ea	3	X	2	1	1	1
29	81100G13	Harness, Sensor	ea	7	X	2	1	1	1
30	81100G12	Harness, Sensor	ea	7	X	2	1	1	1
31	82481H01	Socket, Fl. Lamp	ea	7	X	2	4	1	4
32	69374H01	Relay, SPST	ea	1	X	2	1	1	1
33	29423G09/G10	Cord, Serv. 20A	ea	1	X	2	1	1	1
34	34196H01	Overlay	ea	3	X	2	1	1	1
35	89820H70	Harn., Key Sw	ea	1	X	2	1	1	1

Item No.	Part No.	Item Name	U/A	EC	SL	PLT	Qty/ El	QUP	TQ
36	33529H01	Harn, Cont Pan	ea	1	X	2	1	1	1
37	33529H02	Harn, Cont Pan	ea	1	X	2	1	1	1
38	33807G11	Solid Door	ea	1	X	2	1	1	1
39	33534H01/H02	Top Hinge Bracket	ea	1	X	2	1	1	1
40	33535H01/H02	Bot. Hinge Bracket	ea	1	X	2	1	1	1
41	49231H02	Hinge, Power Cartridge	ea	3	X	2	1	1	1
42	34205H01	Handle, Door	ea	3	X	2	1	1	1
43	38497H02	Gasket, Door	ea	1	X	2	1	1	1
44	41026H59	Transformer	ea	1	X	2	1	1	1
45	80080G06	Sensr Bottle Assy	ea	3	X	2	1	1	1
46	80080G07	Sensr Bottle Assy	ea	3	X	2	1	1	1
47	69070H07	Switch, Key	ea	1	X	2	1	1	1

Refer to the Service Manual (Harris 34830H11) for a list of alternate suppliers for replacement parts in Kit C.

Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: _____

Serial Number: _____

Date Purchased: _____

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (Harris/P-H or specific agent/rep organization), and purchase order number.

IF YOU NEED ASSISTANCE:

Harris/P-H SALES DIVISION

Phone:	704/658-2711 800/221-4201
FAX:	704/658-0363

LABORATORY PARTS and SERVICE

Phone:	800/438-4851
FAX:	704/658-2576

TECHNICAL SUPPORT

Phone:	800/438-4851